

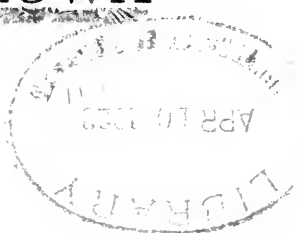
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FIRST SERIES No. 56

JANUARY 1, 1922

UNIVERSITY OF IOWA STUDIES



STUDIES IN CHILD WELFARE

VOLUME II

NUMBER 1

MENTAL GROWTH CURVE OF NORMAL AND SUPERIOR CHILDREN

STUDIED BY MEANS OF CONSECUTIVE
INTELLIGENCE EXAMINATIONS

BY
BIRD T. BALDWIN
AND
LORLE I. STECHER

PUBLISHED BY THE UNIVERSITY, IOWA CITY

222605
55.28

Issued semi-monthly throughout the year. Entered at the post office at Iowa City, Iowa, as second class matter. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

UNIVERSITY OF IOWA STUDIES IN CHILD WELFARE

PROFESSOR BIRD T. BALDWIN, PH. D., EDITOR

FROM THE IOWA CHILD WELFARE RESEARCH STATION

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MENTAL GROWTH CURVE OF NORMAL AND SUPERIOR CHILDREN

I. THE MENTAL GROWTH CURVE

1. *Statement of the Problem.* Contemporary discussions of the mental growth curve have their parallel in the early history of anthropometry, when scientists attempted to find the general laws of growth and to depict the trend of the average curve of physical development. Refinement of technique and a better analysis of the growth process have shown wide individual differences in the growth of children, which make it impossible to represent these variations adequately by a single mean curve. It is now known that there are differences in the curves for boys and girls, for tall and short children, for physiologically accelerated and retarded children, as well as for children of different race, different environment, and different social status.

On the analogy of the physical growth curve a number of writers have constructed theoretical mental growth curves, generally with rather a steep rise in the early years of life and a flattening out after the age of puberty. One author has suggested, without experimental data, that this curve should really be concave in the early years, owing to what he believes to be the slow rate of development during infancy. The concept of different rates of development in the subnormal classes has become so firmly established that text-books generally visualize for the student the supposed growth curves of the three classical levels of feeble-mindedness. It has also been suggested in the literature that superior children grow at a faster rate and have a steeper curve than the average.

All of these problems concerning the general trend of the growth curve, the rate of improvement of children of different intellectual ability, variability in mental development, the possibility of prediction in mental growth, and the relation between physical and mental growth can be solved only through a study of consecutive re-examinations and observations of the same group of children throughout a number of years. The data of this study

furnish the basis for the beginning of an empirical determination of these aspects of the mental growth process.

2. *Data for this Study.* In September, 1917, several hundred children were examined at the Iowa Child Welfare Research Station by the Stanford Revision of the Binet Scale, with a view to following the mental development of the children from year to year.¹ The continuity of the work was interrupted by war conditions² and by the shifting³ of the school population particularly characteristic of a university town, but 143 individual records are sufficiently complete for the purposes of this analysis. Chart I

CHART I

TYPICAL RECORD CARD FOR SUCCESSIVE EXAMINATIONS.

NAME <i>Holman, Katharine</i>										DATE OF BIRTH <i>7-12-09</i>									
DATE OF EXAM.-1 <i>10-23-17</i> 2 <i>11/18/18</i> 3 <i>11/14/19</i> 4 <i>11/16/20</i> 5 <i>5/2/21</i>																			
GRADE <i>5th EV</i> <i>6th EV</i> <i>8th LW</i> <i>9th LGS</i> <i>9th LGS</i>																			
TEST	1	2	3	4	5	6				TEST	1	2	3	4	5	6	7	8	
III	X	X	X	X	X	X				IX	X	X	X	X	X	X			
IV	X	X	X	X	X	X				X	X	X	X	X	X	X			
V	X	X	X	X	X	X				XII	X	X	X	X	X	X	X	X	
VI	X	X	X	X	X	X				XIV	X	X	X	X	X	X	X	X	
VII	X	X	X	X	X	X				XVI	X	X	X	X	X	X	X	X	
VIII	X	X	X	X	X	X				XVIII	X	X	X	X	X	X	X	X	
SCORES								1		2		3		4		5			
CHRONOLOGICAL AGE								8 ³		9 ⁴		10 ⁴		11.4		11.10			
TERMAN AGE								11 ⁶		13 ⁵		16 ⁴		17.1		17.7			
I.Q.								139		143		158		151		149			

¹During the first year the Yerkes-Bridges Point Scale was given at the same time as the Stanford Revision, or a day later. Although this study is limited to the data from the Stanford Revision, the Pearson coefficient of correlation between the ratings by the two scales, all of the examinations being made by the same individual, was found to be for 76 cases +.888 with a P.E. of $\pm .016$.

²The original plan for the re-examinations had the support of the Acting Director of the Child Welfare Research Station, Ellsworth Faris, during the Director's absence in military service.

³A number of children who had left the university school were followed up and examined in the public schools. A fifth examination on one girl was obtained through the courtesy of Professor L. W. Cole, who examined her in Colorado Springs.

shows a typical record for successive examinations. The records may be divided into four groups: (a) 56 having two examinations; (b) 51 additional cases having three examinations; (c) 42 of the three examination cases on whom a fourth examination was obtained; (d) additional 36 cases having five consecutive examinations.

The conditions for a study of this kind were particularly favorable. The University Observational Schools, in the same building as the Child Welfare Research Station, are attended largely by the children of the professional and business men of the city and of prosperous farmers nearby. The tuition is small, making the expense comparable to that of children attending the public schools of the town where text-books are not supplied. The tone of the school is free and democratic. The children are accustomed to all sorts of educational and psychological experiments and regard the annual re-examination as a regular part of the school program. There is no reason to believe that any undue amount of communication or discussion went on among the children in regard to the mental tests; in fact, the examiner frequently noted the fact that a child remembered having been asked a certain question a year ago but did not give further evidence that the answer had been learned. The investigation had the interest and support of the school staff, most of whom were college graduates who were anxious to make the experimental conditions as favorable as possible.

The examinations were given by four psychologists¹ during the period between September, 1917, and May, 1921. In all 485 mental age determinations were made on 143 children. Of these 178 were given by Miss Vest, 8 by Miss Schriefer (who was devoting her time to the examination of other children entering the school), 77 by Miss Wagoner, and 222 by Miss Stecher.

With a view to tracing the possible effect of the personal equation, the material was arranged (Table XI) so as to show what proportion of the children in a given group were examined by the same examiner.² In the Five Examination Group both the first and second examinations were made by Miss Vest in 91.4% of the cases; in the Four Examination Group Miss Vest gave 30.2% of the repeated examinations, in the Three Examination Group

¹Eloise Vest, A. M., Louise Schriefer, A. M., Lovisa Wagoner, A. M., Lorle I. Stecher, Ph. D.

²In the statistical treatment of the data in this *study* the writers had the co-operation of Gladys M. Fairbanks, A. M.

22.2%, and in the Two Examination Group 28.6%. Consecutive examinations of the same children were given by Miss Stecher as follows: in the Two Examination Group 3.5% of the first and second; in the Four Examination Group 18.6% of the second and third, 18.6% of the second and fourth, 100% of the third and fourth; in the Five Examination Group 40% of the third and fourth, 40% of the third and fifth, 100% of the fourth and fifth. That re-examination by the same person is of practically no significance in raising the correlation is shown in connection with the coefficients of correlation on page 45.

The subjects of the study were of average and superior intelligence with a range of I. Q. from 90 to 167. The four groups were nearly equal in mental ability as shown by the mean I. Q. of the boys and girls of the different groups.

Group	5 Exam.	4 Exam.	3 Exam.	2 Exam.
Boys	120.6	114.0	112.8	115.0
Girls	118.8	113.6	112.3	113.4

It will be noted that the mental ability of the boys was practically the same as that of the girls.

3. *Method of Determining the Mental Growth Curve.* Terman (26) 1919, p. 127, has stated that "the standardization of the Binet scale on the basis of age norms makes it a valuable instrument for the investigation of mental growth curves." The mental growth curves presented herewith are probably the first curves for superior and average children of the development of general intelligence studied by means of repeated examinations on the same children.

The mental examinations on which these growth curves are based were made at irregular intervals, ranging on the average from 6 to 16 months within the period of four years. In order to plot the curve at the customary one-year intervals, the mental ages, instead of being assigned to the year nearest the chronological age, as is the usual custom, were calculated and weighted in such a manner as to give the mental age at exact years. This method assumes that the child continues to grow mentally at the same rate between the examination intervals. A child actually measured at the age of 5 years-5 months would, under the usual method, be considered as five years and its mental age averaged with the mental age of other children who might actually have varied between 4 years-7 months and 5 years-6 months at the time of the examination. To prevent this distortion of the real age,

mental and chronological, a new mental age was computed for each chronological age during the period of measurement. The method used was as follows:

For each child the difference between every two successive chronological ages and every two successive mental ages was calculated and the rate of improvement obtained by dividing the difference in mental age by the difference in chronological age. For example, take the case of a boy who had his second examination at the age of 6 years-1 month, and his third examination at the age of 7 years-2 months, giving a difference in chronological age of 13 months. His mental age at the earlier examination was 8 years-8 months, and at the later, 10 years-2 months, the difference in mental age being 18 mental months. The mental age difference divided by the chronological age difference results in a rate of improvement of 1.38. This means that he grew 1.38 mental months for every month of chronological age. The mental age at the time of the earlier examination was then corrected by subtracting from the mental age of 8 years-8 months, or 104 mental months, the number of mental months equivalent to one month's growth at the rate of 1.33 (which is the rate at which he was growing previous to 6-1). This gives a new mental age at 6 years of 104 mental months—1.33 mental months, or 102.67 mental months. The corrected mental age at 6 years was 102.67 months. The corrected mental age at 7 will be the mental age at 6 years-1 month, +11 months at the rate of 1.38, or $102.67 + (11 \times 1.38)$ or 117.85 mental months.

The resultant mental ages were averaged for each chronological age from 5 to 14 for all of the boys and all of the girls of the group and for the normal and superior boys and girls separately. The resultant mental growth curve is shown in Table I and Chart II.

The rates of growth used for correcting the mental ages from the exact year to year by the method of monthly rates described above were averaged by chronological age groups to give the total growth of each child for all year intervals. The resultant composite rates were averaged for each year interval to obtain the annual rate of growth. The corrected mental ages were then divided by the chronological ages at the exact years in order to determine the new rate of improvement between every two successive mental ages. These new rates were averaged by years to give the rate of mental growth shown in Table III and Chart V.

The new I. Q.'s for each exact chronological age were averaged to give Chart IV and Table II.

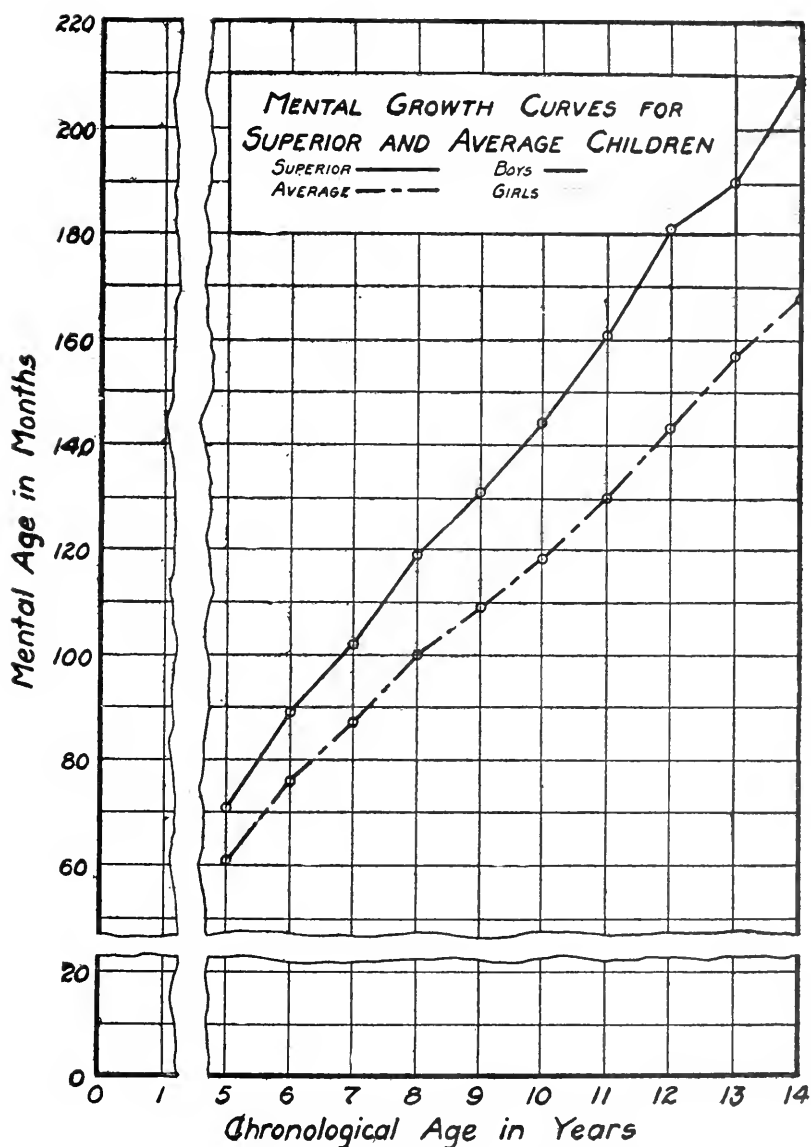
4. *The Analysis of the Mental Growth Curve.* The mental growth curves obtained by the individualizing method from consecutive measurements of superior and average boys and girls between the ages 5 to 14 present at first glance the appearance of a straight line. The familiar parabolic character of the theoretical growth curve is lacking, since our data furnish us no determinations for ages 14 to 16, during which this slowing up of mental growth is supposed to take place.

TABLE I MEAN MENTAL AGE IN MONTHS OF SUPERIOR AND AVERAGE BOYS AND GIRLS FOR SUCCESSIVE CHRONOLOGICAL AGES (Based on 487 Consecutive Examinations)				
Chronological Age	Boys		Girls	
	Intelligence Quotient 110+ (Superior)	Intelligence Quotient 90-110 (Average)	Intelligence Quotient 110+ (Superior)	Intelligence Quotient 90-110 (Average)
5	70.6	60.7	72.0	62.5
6	88.7	75.6	85.0	73.9
7	102.2	87.4	102.2	88.9
8	118.7	100.4	116.3	100.9
9	131.4	109.2	131.1	112.9
10	144.0	117.7	145.5	122.4
11	160.5	130.5	158.5	133.3
12	181.0	143.1	184.1	141.5
13	190.0	157.2	196.0	166.5
14	208.9	168.0	201.0	182.9

It is apparent from these curves that superior and average children develop at different levels and that children of these different intellectual levels grow increasingly dissimilar with increase in chronological age. For example, at the age of 5 the superior and average boys have a mental age of 71 and 61 mental months respectively, but at 14 the superior have 209 and the average 168. The difference of 10 points at 5 years has increased to 41 points at 14 years. The girls show similar differences.

This divergence in the growth curves of average and superior children has long been assumed as probable but has not heretofore been empirically demonstrated. The concept of the I. Q. pre-

CHART II



supposes a certain divergence in the curves of the superior and the average child, as the superior child has to grow at a rate greater than one mental month for one chronological month in order to maintain a constant I. Q.

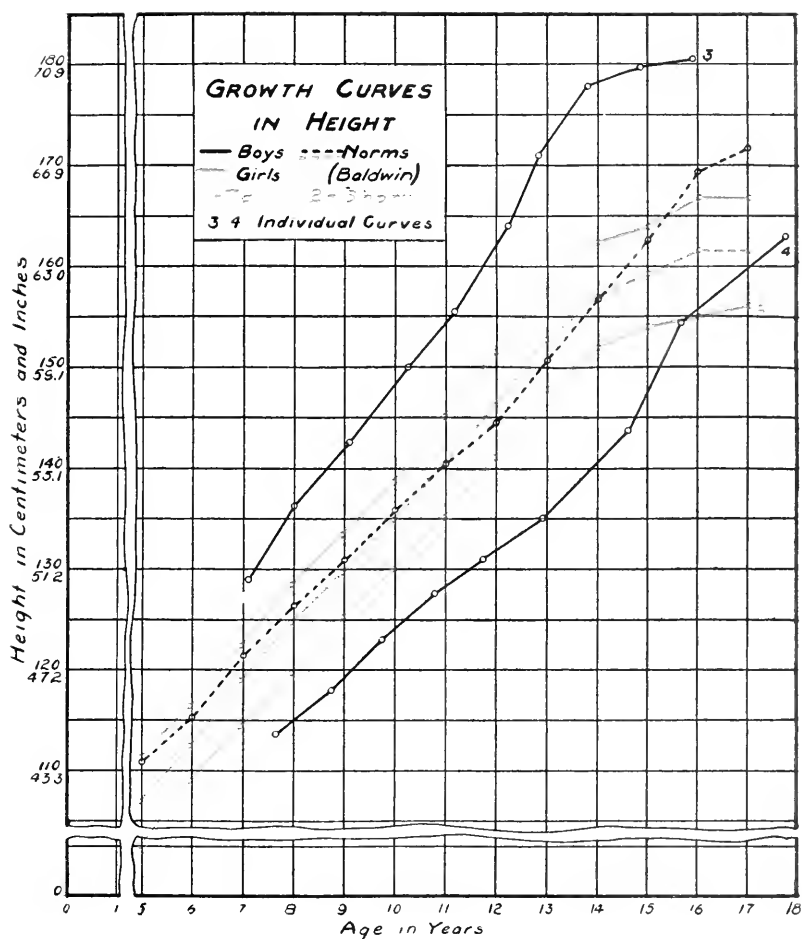
The general straight line appearance previously noted is especially apparent in the growth curve for boys. Further analysis reveals, however, a very significant change in the trend with the approach of adolescence. This is especially marked in the curve for girls where there is a rise in mental development in the superior girls between the ages 11 to 12 and in the average girls a year later, between the ages 12 to 13. The superior boys show a similar acceleration in mental growth at about 12—somewhat later than in the case of the superior girls. The boys of average mental ability have not yet shown this acceleration up to 14 years, which is the latest age for which we have a sufficient number of cases. It seems unlikely that this rise in the curve of mental growth can be explained by defects in the measuring scale at the adolescent ages. There is no reason to believe that the scale was not equally well standardized at all ages. The increased incline of the curve extends, moreover, through several ages, and it is not probable that the tests would be too easy throughout these years.

The mental growth curves of the boys and girls cross repeatedly. There is, however, a tendency in the earlier ages for the average girls to be a little higher in mental age than the average boys, in the later ages for the girls of both groups to be a little superior to the boys. While not without exception, this adolescent superiority of girls is in accordance with other facts indicative of the earlier maturity of girls.

There has been in recent years a movement to discredit characteristic changes in intellectual traits as a result of adolescence. This point of view, which is probably a reaction to undue sentimental emphasis of those changes current in the psychology of twenty years ago, is expressed by Terman (25) 1917, p. 60, who maintains there is little evidence of periodicity, or irregularity as far as general intelligence is concerned, and throws doubt on the existence of the adolescent spurt. Although there is obviously no time in the mental development of the child when new mental traits suddenly appear, the rise in the mental growth curves apparent at the ages of 11 to 14 may be attributed to increased strength of traits that have long been developing, or to increased mental vigor similar to the accelerated growth in physical traits.

The existence of such a period of increased vigor would not necessarily interfere with the stability of the I. Q., providing the scale was adapted in difficulty to such a change. It certainly would not affect the individual's position in the group relative

CHART III



to a norm, since the norm at these ages would also be higher if all children developed in a similar way. A child's physical status in height, for example, remains relatively constant with reference to its group from age 6 through adolescence, as shown by Baldwin (1) 1914, though the norms and individual curves may show adolescent accelerations.

The mental growth curves are strikingly similar to the physical growth curves in height as shown in Chart III. This chart here published for the first time illustrates the differences in the growth of tall, average and short girls and of a tall and a short

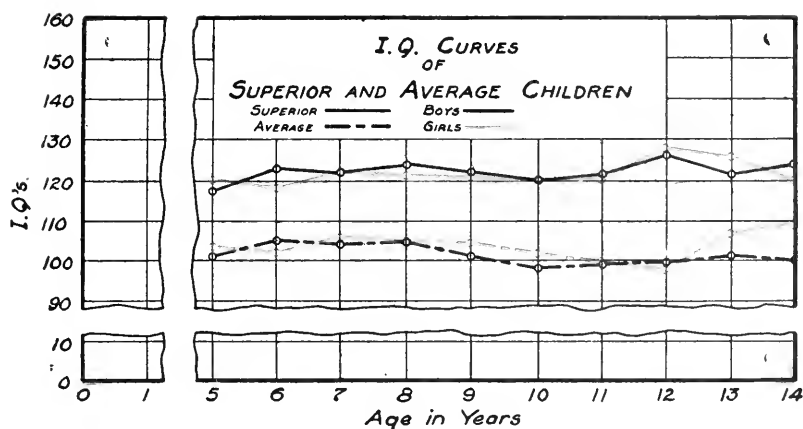
boy as compared with the norms for boys and girls. The norms for average boys and girls are based on 6 to 10 years of semi-annual measurements for 60 boys and 60 girls. The curves for tall girls are based on similar material for 52 cases distributed above the norm, and the curves for short girls on 28 cases considerably below the norm. The curves show the same phenomena that have been pointed out in connection with the mental growth curves. In both cases the curve at the higher level shows the acceleration at an earlier age.

TABLE II
MEAN INTELLIGENCE QUOTIENTS OF SUPERIOR AND AVERAGE BOYS AND GIRLS FOR SUCCESSIVE CHRONOLOGICAL AGES

Chronological Age	Boys		Girls	
	Intelligence Quotient 110+ Superior	Intelligence Quotient 90-110 Average	Intelligence Quotient 110+ Superior	Intelligence Quotient 90-110 Average
5	117.6	101.2	119.9	104.1
6	123.3	105.0	118.0	102.6
7	121.6	104.0	121.7	105.9
8	123.6	104.6	121.1	105.1
9	121.7	101.1	120.5	104.6
10	119.9	98.1	120.3	102.1
11	121.5	98.8	119.8	99.9
12	125.7	99.4	127.9	98.2
13	121.5	100.8	125.7	106.7
14	124.3	100.0	119.7	108.9

5. *The Analysis of the I. Q. Curve.* The mean intelligence quotients (Table II) and the I. Q. curves (Chart IV) for superior and average boys and girls show some of the same characteristics observed in the mental growth curves. The curves are in general approximately horizontal, confirming within limitations the constancy of the I. Q. There appear to be, however, certain definite phenomena associated with physiological development that show themselves in a decrease or increase in the I. Q. at certain chronological ages. A study of the physical development of young children shows that there is considerable fluctuation between the ages 4 and 7. These I. Q. curves suggest a similar condition with a small spurt in mental development, appearing a little later in the boys than in the girls. Both superior boys and girls show a rise in the I. Q. between the ages of 11 and 12. Average girls

CHART IV



also show this adolescent acceleration, although it appears a year later than in the case of superior girls. The I. Q. curve and the mental growth curve of the average boys do not show this phenomenon, possibly because they have not reached this stage of acceleration.

6. *The Analysis of the Curve of the Rate of Mental Growth.* Our tables of original data do not include calculations of the actual number of mental months growth for one chronological month between examinations, although these were used in all

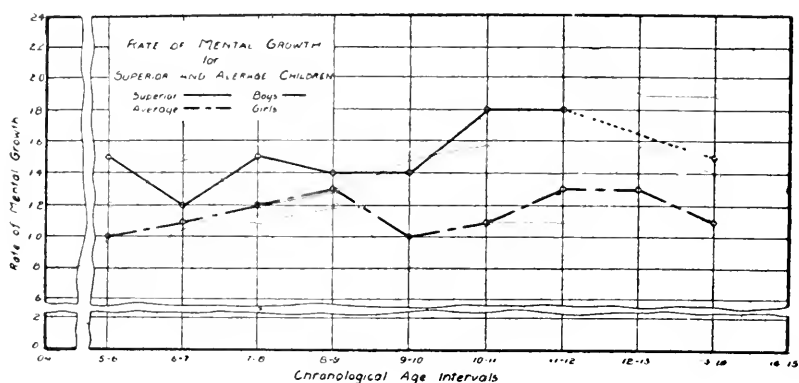
TABLE III
MEAN RATE OF MENTAL GROWTH OF SUPERIOR AND AVERAGE BOYS AND GIRLS FOR CHRONOLOGICAL AGE INTERVALS

Chronological Age Intervals	Boys		Girls	
	Intelligence Quotient 110+ Superior	Intelligence Quotient 90-110 Average	Intelligence Quotient 110+ Superior	Intelligence Quotient 90-110 Average
5-6	1.5	1.0	1.2	.8
6-7	1.2	1.1	1.5	1.1
7-8	1.5	1.2	1.2	1.1
8-9	1.4	1.3	1.3	1.2
9-10	1.4	1.0	1.5	.8
10-11	1.8	1.1	1.6	1.1
11-12	1.8	1.3	2.2	1.1
12-13	(1.1)	1.3	1.9	1.6
13-14	1.5	1.1	1.9	1.4

cases as a basis for the curve of the rate of mental growth. Inspection of the tables will show for individual children great fluctuation in the rate from examination to examination. A child whose rate from the first to the second examination is 1.56 mental months for each month of chronological age may show between the second and third examination a rate of .23 mental months for each chronological month. Part of this discrepancy is of course due to the experimental error of each single mental age determination, but the size of many of the irregularities cannot be explained on this basis. It appears that there is no rate of improvement which is characteristic of the individual and uniformly maintained throughout his years of mental growth although an approximately constant rate is maintained in many cases.

Table III and Chart V show the mean rate of mental growth for these children. The average children grow approximately

CHART V



one mental month for each chronological month, while the superior children have a higher rate (shown by the curve at a higher level) except in the case of boys between 12 and 13, where the small number of cases results in a decreased rate (printed in parenthesis in Table III and represented by a dotted line in Chart V). The effect may also be noted in the mental growth curve for superior boys, Chart I.

There is little difference, on the average, in the rate of growth of these two groups of children. In no case is the difference

greater than seven-tenths of a year. These figures cannot of course be considered as norms, since they depend upon the selection of cases included in the study. The addition of more cases of very superior intelligence, or of more cases of I. Q.'s below 100 would have increased the difference.

The general prepubertal increase in mental development becomes evident earlier in the case of superior children than in average children, and in the case of superior girls about a year earlier than in average boys. In comparing the curves it should be kept in mind that a child who has been growing at a certain rate and then reaches a period of little or no increase will have to reattain the rate of growth at which he was previously developing before an actual acceleration in growth can be considered as taking place. The period of acceleration is therefore later than the point in the curve at which the steep rise begins. In general all of these curves show less difference between average and superior boys in regard to these adolescent phenomena than between average and superior girls, who are usually a year apart in their general development.

Our data do not permit us to give a definite answer to the question whether superior children grow more superior as time goes on through an increase in the rate of mental growth. The curves for the two groups of children seem to diverge slightly at the higher ages, especially in the case of girls at the adolescent years. The facts in regard to the change of I. Q. to be reported later on page .. seem also to indicate some characteristic differences in the growth of children of different I. Q. level. We should hesitate, however, to make any generalization in regard to this matter from the material presented in this study.

7. *Mean Group Differences at Successive Examinations.* Table V is purely descriptive, presenting the mean chronological age at successive examinations and the mean interval between examinations for use in interpreting the findings in other tables. The findings of Table IV are averages of the I. Q.'s obtained at each examination by the children of each particular group.

It is a very significant fact that the mean I. Q. of each of the four groups of children increased with each successive examination, which must be regarded as an effect of greater habituation or practice. The increase in the mean I. Q. is proportionate to the number of re-examinations.

The mean I. Q. for the Five Examination Group increased from 115.39 through 119.5, 119.75 and 123.91 to 126.7. The mean I. Q. for the Four Examination Group increased from 111.06 through 112.02 and 115.16 to 118.20. The mean I. Q. for the Three Examination Group increased from 110.59 through 111.80 to 115.21. The mean I. Q. for the Two Examination Group increased from 112.3 to 115.8. This increase in I. Q. has been noted by previous workers on a single retest in the summary by Rugg and Colloton (21).

TABLE IV MEAN INTELLIGENCE QUOTIENTS AT SUCCESSIVE EXAMINATIONS						
Group	No. of Cases	Exam. 1	Exam. 2	Exam. 3	Exam. 4	Exam. 5
5	36	115.4	119.5	119.8	123.9	126.7
4	42	111.1	112.0	115.2	118.2
3	51	110.6	111.8	115.2
2	56	112.3	115.8

There is also an increase in the mean rate of improvement upon successive examinations. To investigate this phase of the practice effect, the data for the Four and the Five Examination Groups were worked over to give for each child the amount of increase in mental age months for each month of chronological age increase between the first and second examination, the second and third and the third and fourth. The means of these individual rates of improvement reveal a general increase in the rate of mental development which is especially marked between the third and fourth examination in the case of the girls.

Examination	No. cases	I-II Rate	II-III Rate	III-IV Rate
Boys	37	1.48	1.42	1.73
Girls	34	1.29	1.64	2.40

8. *Discussion and Literature.* It is extremely probable that the theoretical mental growth curves found in so many textbooks really misrepresent the facts of mental development. It has been the custom to draw the growth curves of children of different degrees of ability as if all of these curves began with zero ability at the time of birth and from that time on rose steadily. From all that we know in regard to differences in the mental capacity of young children, the curves of mental development, like the curves of physical development, begin at dif-

TABLE V
MEAN CHRONOLOGICAL AGE AND MEAN INTERVAL BETWEEN SUCCESSIVE EXAMINATIONS

Examina- tion	1		2		2-3		3		3-4		4		4-5		5	
	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.	Chron. Age	Interval in Mos.
5 Boys	8-2	16.1	9-3	13.5	10-5	7.9	11-1	6.0	11-7	5.9	11-11	6.0	11-7	5.9	11-11	6.0
Girls	8-6	13.5	9-7	16.1	10-11	6.5	11-6	5.9	11-11	6.0	11-11	6.0	11-7	5.9	11-11	6.0
4 Boys	8-0	13.2	9-5	13.3	10-6	6.3	11-0	5.9	11-6	5.9	11-6	5.9	11-11	6.0	11-11	6.0
Girls	8-7	16.9	9-10	10.5	10-9	6.6	11-3	6.6	11-3	6.6	11-3	6.6	11-11	6.0	11-11	6.0
3 Boys	7-9	15.1	9-3	13.8	10-5	5.9	11-2	5.9	11-2	5.9	11-2	5.9	11-11	6.0	11-11	6.0
Girls	9-0	14.9	10-3	11.3	11-2	5.9	11-2	5.9	11-2	5.9	11-2	5.9	11-11	6.0	11-11	6.0
2 Boys	8-0	16.4	8-3	5.9	10-5	5.9	11-2	5.9	11-2	5.9	11-2	5.9	11-11	6.0	11-11	6.0
Girls	7-1	14.7	9-4	5.9	11-2	5.9	11-2	5.9	11-2	5.9	11-2	5.9	11-11	6.0	11-11	6.0

ferent levels (points). There are individual mental differences at birth as there are individual differences in height. It is not conceivable that the feeble-minded child should begin at the same point with the child of average or superior ability and then drop back in the race as his more gifted brothers gain. The truth of the matter is, he runs on a relatively lower level throughout life.

Much of the work on retests of children has been done with feeble-minded subjects. While it is impossible in this study on normal and superior children to go into the question of growth curves of the feeble-minded, it will orientate the problem if we review briefly such other studies as have been made with repeated examinations. Bobertag (6) p. 528, reported in 1912 as a result of retests on 83 children whom he had examined the year before that children whose intelligence is above average advance more rapidly; those whose intelligence is below average advance more slowly. He maintained (p. 531) that if one

limits one's self to a few successive years—8, 9, 10, for example—one could say that the I. Q. is approximately constant. If, however, one considers all the ages, or the whole developmental course of children's intelligence it is very questionable whether the assumption of a constant I. Q. is tenable.

Berry (4) in 1913 found on a retest of 82 children that the normal subjects made an average gain of 1 year, and the feeble-minded—mental ages 4-11 years—an average gain of .5 of a year. He did not report the correlation between the examinations.

Bloch (5) 1915 re-examined defective children by the Binet scale.

Stern (23) (24) 1914 and 1916, who discussed the subject at length, but without experimental data of his own, believed that the I. Q. did not afford an actually constant expression of degree of feeble-mindedness but showed a tendency to fall in value as chronological age increased and the age of arrest was approached.

Descoudres (9) 1915 retested 26 children of a special class and found the I. Q. very similar to the previous one with a greater tendency to increase. Cases with three or four examinations showed practically the same I. Q. with less than 50% variation.

Terman (25) p. 55, 1917 concluded from re-examinations that "the results of 140 such tests show as far as the age of 13 or 14, even when the tests are separated by as much as five years, changes of 10 points in 12 are relatively rare. In general, it can be said that the superior children of the first test are found superior in the second, the average remained average, the inferior remain inferior, the feeble-minded remain feeble-minded and nearly always in approximately the same degree. The most marked exceptions to this rule are found with the feeble-minded whose intelligence quotient shows a tendency to decrease considerably."

Cuneo and Terman (8) 1918, retested 77 children and found high correlations between the two tests.

Terman (26) 1919 found considerable agreement in the I. Q.'s of 46 children tested three or more times. He says, p. 147: "It is possible that feeble-minded children testing below 60 are less likely to hold their own than those of milder degree of defect. . . . On the other hand the I. Q. as determined by the Stanford-Binet (or any other intelligence scale yet devised) cannot **indefinitely** hold its constancy in the case of children who are exceptionally superior."

Wallin (28) 1919 discussed the use of the I. Q. in classification without data from retests. His article has been critically reviewed by Rosenow (20) 1920, who presents experimental evidence of approximate stability of the I. Q. from retests of 69 cases examined at about 10 months interval.

Wallin (29) 1921 reported re-examinations on 153 children by different revisions of the Binet tests.

Kuhlmann (17) (18) who had discussed the intelligence of the feeble-minded is also reported by Hollingworth (15) p. 105 in 1920 to have found that "On the whole the I. Q. for a given case remains constant with a slight tendency on the average to decrease after the ages of about nine or ten."

Kuhlmann (18a) 1921 reported results on 639 cases ranging from idiocy to nearly normal mentality examined 2 to 5 times within a 10 year period by the Binet and Kuhlmann series. He found that the I. Q. decreased with age and more for the higher than for the lower grades.

Garrison (13) 1921 retested by the Stanford-Binet 94 children who had previously been tested by the Goddard Revision and found on the whole, a rather close correspondence.

Doll (10) 1921, from a study of numerous growth curves for feeble-minded subjects who had received at least 5 annual examinations, believes in an age of arrest for the feeble-minded beyond which the I. Q. would decrease. Terman (27) 1921 criticizes this presentation and the conclusion drawn from the data.

Freeman (12) 1921, published an important discussion on the concept of the I. Q. with reference to age scales and point scales.

Rugg and Colloton (21) 1921, have assembled the reports of other workers with Stanford-Binet tests and added data from 137 cases of their own. They find that with one exception investigators have found an average difference in I. Q. on re-examination of 4.5 points, and confirm in some other respects Terman's 1917 conclusions.

The literature summarized above presents many interesting problems in regard to the age of arrest or the limit of mental growth. Our data do not extend far enough to permit us to speculate on the age at which mental growth ceases in the normal or superior child, though there is reason to suspect that the mental age curves of some of the superior girls are beginning to flatten out with a resulting decrease in I. Q. Even so this may be merely

a fictitious slowing up of mental growth due to the inevitable "bumping" into the upper limit of the scale.

SUMMARY AND CONCLUSIONS

1. The fundamental problems concerning the general trend of the growth curve, the rate of improvement of children of different intellectual ability, variability in mental development, the possibility of prediction in mental growth and the relation between physical and mental growth can be solved only through a study of consecutive reexaminations and observations of the same group of children throughout a number of years.

2. The mental growth curves presented herewith are probably the first curves for superior and average children of the development of general intelligence studied by means of repeated examinations on the same children.

3. The curves constructed from the corrected mental age ratings do not misrepresent the actual growth process as is the case when the chronological age is approximated to the nearest year.

4. It is apparent from these curves that superior and average children develop at different levels and that children of these different intellectual levels grow increasingly dissimilar in mental age with increase in chronological age. This divergence in the growth curves of average and superior children has long been assumed as probable but has not heretofore been empirically demonstrated.

5. An analysis of the mental growth curve reveals a significant change in the trend with the approach of adolescence, which appears earlier in the case of superior children. There is also an adolescent superiority of girls which is in accordance with other facts indicative of the earlier maturity of girls.

6. The mental growth curves are strikingly similar to the physical growth curves in height.

7. The I. Q. curves are approximately horizontal, confirming within limitations the constancy of the I. Q. There are fluctuations associated with physical development.

8. The curves of the rate of mental growth are higher for superior than for average children, and seem to diverge slightly at the adolescent years.

9. The general prepubertal increase appears earlier in the case of superior children.

10. The mean I. Q. of each of the four groups of children increased with each successive examination, which is probably an effect of greater habituation or practice.

11. There is also an increase in the mean rate of improvement on successive examinations.

II. THE POSSIBILITY OF PREDICTION IN MENTAL GROWTH

1. *Intelligence Status of Individuals at Successive Examinations.* The stability of the I. Q. is one of the most important problems under discussion by psychologists at the present time. Upon the relative stability of the ratio between mental and chronological age depends to a large extent the possibility of prediction in mental growth.

Binet and Simon felt very doubtful of the possibility of using the I. Q. for prediction. Even Bobertag (5) and Stern (24), who are among the earliest advocates of the use of the I. Q., did not believe that it would remain constant for later ages.

The question of the stability of the I. Q. has been discussed in a number of theoretical articles. Some writers believe that it remains practically constant and others have found a tendency for the I. Q. of the feeble-minded to decrease and for the I. Q. of the superior to increase. Any conclusive answer to the question of whether the I. Q. remains constant depends upon the accumulation of a sufficient number of long-time mental growth curves for children of different intellectual capacity.

Terman (26) 1919, p. 137, states the problem briefly thus: "By applying it [the Binet scale] repeatedly to the same children we can find out whether constancy or irregularity rules. Prediction hinges on the question whether a child who is found by the test to be a given per cent above or below the mental level normal for his age continues to be accelerated or retarded to the same degree. The answer is found in the extent to which the I. Q. remains constant."

Psychologists who have been accustomed to thinking that all that was required for a solution of the problems of mental growth was the accumulation of a sufficient number of re-examinations for long periods will find that the repetition of the intelligence scale brings up many puzzling new problems. A study of the original data, Tables VI and VII, shows just what variations in

TABLE VI
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—BOYS

1. Average I. Q. 158.0.					
Examiner	E. V.	E. V.			
Chronological Age	5-3	5-10			
Terman Age	8-5	9-1			
I. Q.	160	156			
2. Average I. Q. 150.7.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological Age	5-11	7-0	7-11	8-6	
Terman Age	8-5	9-4	13-3	13-9	
I. Q.	142	133	167	161	
3. Average I. Q. 143.6.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological Age	5-1	6-1	7-2	8-1	8-7
Terman Age	7-4	8-8	10-2	11-7	12-8
I. Q.	144	142	142	143	147
4. Average I. Q. 142.6.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological Age	8-2	9-3	10-3	11-2	11-8
Terman Age	11-1	12-1	15	16-11	17-8
I. Q.	135	130	146	151	151
5. Average I. Q. 138.2.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological Age	5-8	6-9	7-9	8-8	9-2
Terman Age	7-6	9-9	10-3	11-7	13-9
I. Q.	132	144	132	133	150
6. Average I. Q. 137.					
Examiner	L. W.	L. I. S.			
Chronological Age	5-9	6-11			
Terman Age	7-8	9-9			
I. Q.	133	141			
7. Average I. Q. 134.5.					
Examiner	E. V.	L. W.			
Chronological Age	6-10	9-2			
Terman Age	8-9	12-11			
I. Q.	128	141			
8. Average I. Q. 131.8.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological Age	10-7	12-1	12-7	13-7	14-0
Terman Age	12-5	16-8	17-2	18-1	19-0
I. Q.	117	136	137	133	136
9. Average I. Q. 129.0.					
Examiner	L. W.	L. I. S.			
Chronological Age	6-1	7-0			
Terman Age	7-4	9-7			
I. Q.	121	137			
10. Average I. Q. 128.0.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	
Chronological Age	6-3	7-4	9-4	9-10	
Terman Age	8-0	9-4	11-4	13-4	
I. Q.	128	127	121	136	
11. Average I. Q. 128.0.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological Age	6-1	7-1	8-8	9-1	9-7
Terman Age	7-6	9-2	11-3	11-6	12-9
I. Q.	123	129	129	126	133
12. Average I. Q. 127.6.					
Examiner	E. V.	L. S.	L. I. S.	L. I. S.	L. I. S.
Chronological Age	10-6	12-0	13-1	13-6	14-0
Terman Age	12-8	15-5	17-0	17-6	18-6
I. Q.	120	128	129	129	132
13. Average I. Q. 127.2.					
Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
Chronological Age	7-1	8-8	9-1	9-8	
Terman Age	8-6	11-2	12-1	12-4	
I. Q.	120	129	133	127	
14. Average I. Q. 126.0.					
Examiner	L. W.	L. I. S.			
Chronological Age	7-3	8-1			
Terman Age	9-2	10-2			
I. Q.	126	126			

TABLE VI—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—BOYS

15.	Average I. Q. 124.5.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	9-1	10-5	11-0	11-7
	Terman Age	10-8	12-6	14-6	14-11
	I. Q.	117	120	132	129
16.	Average I. Q. 124.2.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	8-4	10-4	11-3	11-10
	Terman Age	10-9	11-10	14-1	15-4
	I. Q.	129	114	125	129
17.	Average I. Q. 124.0.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	8-3	9-6	10-6	11-2
	Terman Age	10-1	11-11	13-1	13-11
	I. Q.	122	125	124	125
18.	Average I. Q. 123.5.				
	Examiner	L. W.	L. I. S.		
	Chronological Age	6-11	7-10		
	Terman Age	8-8	9-7		
	I. Q.	125	122		
19.	Average I. Q. 123.5.				
	Examiner	L. W.	L. I. S.		
	Chronological Age	8-7	9-3		
	Terman Age	10-4	11-9		
	I. Q.	120	127		
20.	Average I. Q. 123.0.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	10-4	11-11	12-11	13-5
	Terman Age	12-8	15-0	15-5	16-3
	I. Q.	122	125	119	121
21.	Average I. Q. 122.				
	Examiner	E. V.	L. I. S.		
	Chronological Age	5-4	8-3		
	Terman Age	6-2	10-7		
	I. Q.	116	128		
22.	Average I. Q. 121.7.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	9-8	11-3	12-9	13-3
	Terman Age	11-4	14-1	15-3	16-8
	I. Q.	117	125	119	126
23.	Average I. Q. 121.2.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	5-2	6-6	7-8	7-10
	Terman Age	5-8	7-6	9-5	10-4
	I. Q.	109	115	129	132
24.	Average I. Q. 121.0.				
	Examiner	E. V.	E. V.		
	Chronological Age	10-9	12-4		
	Terman Age	11-9	16-5		
	I. Q.	109	133		
25.	Average I. Q. 120.8.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	8-6	9-7	10-10	11-7
	Terman Age	9-11	11-4	13-3	14-4
	I. Q.	116	118	122	124
26.	Average I. Q. 120.2.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	5-1	5-8	7-0	7-8
	Terman Age	5-10	7-0	7-10	9-6
	I. Q.	114	123	111	124
27.	Average I. Q. 120.0.				
	Examiner	E. V.	E. V.	L. W.	
	Chronological Age	9-0	10-0	11-3	
	Terman Age	10-8	12-1	13-9	
	I. Q.	118	120	122	
28.	Average I. Q. 120.0.				
	Examiner	L. W.	L. I. S.		
	Chronological Age	5-9	6-5		
	Terman Age	6-6	8-2		
	I. Q.	113	127		

TABLE VI—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—BOYS

29.	Average I. Q. 119.7.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	6-10	8-4	9-11	10-5
	Terman Age	7-4	9-4	12-0	14-5
	I. Q.	107	112	122	138
30.	Average I. Q. 119.2.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	5-0	6-6	7-3	7-8
	Terman Age	5-9	7-11	8-7	9-3
	I. Q.	115	122	119	127
31.	Average I. Q. 119.0.				
	Examiner	E. V.	E. V.		
	Chronological Age	7-8	9-1		
	Terman Age	9-2	10-6		
	I. Q.	120	118		
32.	Average I. Q. 118.5.				
	Examiner	E. V.	L. W.		
	Chronological Age	6-0	7-3		
	Terman Age	6-10	8-11		
	I. Q.	114	123		
33.	Average I. Q. 118.0.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	5-3	5-10	7-2	7-10
	Terman Age	6-2	7-0	8-2	9-5
	I. Q.	117	120	114	129
34.	Average I. Q. 118.0.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	10-1	11-2	12-8	13-2
	Terman Age	10-4	12-8	15-5	16-5
	I. Q.	102	113	122	125
35.	Average I. Q. 117.6.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	9-2	10-3	11-5	12-3
	Terman Age	10-3	11-11	14-0	14-10
	I. Q.	112	116	122	121
36.	Average I. Q. 117.5.				
	Examiner	L. S. & E. V.	L. I. S.		
	Chronological Age	11-8	14-3		
	Terman Age	14-3	16-2		
	I. Q.	122	113		
37.	Average I. Q. 117.5.				
	Examiner	E. V.	E. V.		
	Chronological Age	9-10	9-11		
	Terman Age	10-4	11-9		
	I. Q.	117	118		
38.	Average I. Q. 117.0.				
	Examiner	L. W.	L. I. S.		
	Chronological Age	6-1	6-10		
	Terman Age	6-10	8-4		
	I. Q.	112	122		
39.	Average I. Q. 116.6.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	7-9	9-0	10-0	10-8
	Terman Age	9-6	10-6	10-9	12-7
	I. Q.	122	116	107	118
40.	Average I. Q. 116.5.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	8-3	9-3	11-4	11-10
	Terman Age	8-11	10-9	13-3	14-10
	I. Q.	108	116	117	125
41.	Average I. Q. 116.2.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	10-2	11-9	13-3	13-9
	Terman Age	11-11	14-1	14-10	16-1
	I. Q.	117	119	112	117
42.	Average I. Q. 116.0.				
	Examiner	E. V.	E. V.		
	Chronological Age	8-11	9-11		
	Terman Age	10-2	11-8		
	I. Q.	114	118		

TABLE VI—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—BOYS

43.	Average I. Q. 115.5.					
	Examiner	E. V.	E. V.			
	Chronological Age	6-10	7-10			
	Terman Age	7-9	9-4			
	I. Q.	112	119			
44.	Average I. Q. 114.6.					
	Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	5-4	5-11	7-3	7-11	8-6
	Terman Age	5-8	7-0	8-6	8-10	10-4
	I. Q.	106	118	117	111	121
45.	Average I. Q. 113.6.					
	Examiner	E. V.	E. V.	L. W.		
	Chronological Age	9-2	10-2	11-6		
	Terman Age	9-8	10-10	15-0		
	I. Q.	105	109	130		
46.	Average I. Q. 113.4.					
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
	Chronological Age	5-6	6-6	8-1	8-7	9-1
	Terman Age	5-10	7-4	9-0	10-2	10-11
	I. Q.	106	112	111	118	120
47.	Average I. Q. 113.0.					
	Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	8-9	9-9	11-1	11-8	12-3
	Terman Age	9-7	10-6	12-9	13-4	14-8
	I. Q.	109	107	115	114	120
48.	Average I. Q. 112.7.					
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.	
	Chronological Age	11-0	12-7	14-1	14-7	
	Terman Age	11-3	14-10	16-9	16-8	
	I. Q.	102	117	118	114	
49.	Average I. Q. 111.6.					
	Examiner	E. V.	E. V.	L. W.		
	Chronological Age	6-3	7-3	8-7		
	Terman Age	7-2	8-0	9-6		
	I. Q.	114	110	111		
50.	Average I. Q. 111.5.					
	Examiner	L. W.	L. I. S.			
	Chronological Age	7-4	8-2			
	Terman Age	8-4	9-0			
	I. Q.	113	110			
51.	Average I. Q. 111.0.					
	Examiner	M.	L. I. S.			
	Chronological Age	5-4	6-7			
	Terman Age	5-8	7-8			
	I. Q.	106	119			
52.	Average I. Q. 110.5.					
	Examiner	L. W.	L. I. S.			
	Chronological Age	7-4	8-6			
	Terman Age	7-8	9-10			
	I. Q.	105	116			
53.	Average I. Q. 110.0.					
	Examiner	E. V.	E. V.	L. I. S.		
	Chronological Age	6-3	7-9	9-3		
	Terman Age	7-0	8-4	10-10		
	I. Q.	105	108	117		
54.	Average I. Q. 110.0.					
	Examiner	L. W.	L. I. S.			
	Chronological Age	6-4	7-2			
	Terman Age	7-2	7-8			
	I. Q.	113	107			
55.	Average I. Q. 108.7.					
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
	Chronological Age	6-4	7-10	8-5	8-11	
	Terman Age	7-0	8-0	9-2	10-2	
	I. Q.	110	102	109	114	
56.	Average I. Q. 107.5.					
	Examiner	E. V.	E. V.			
	Chronological Age	6-2	7-1			
	Terman Age	6-6	7-10			
	I. Q.	105	110			

TABLE VI—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—BOYS

57.	Average I. Q. 106.7.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	5-11	7-5	8-1	8-7
	Terman Age	6-2	7-10	8-8	9-5
	I. Q.	104	106	107	110
58.	Average I. Q. 106.7.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	11-0	12-2	13-0	13-6
	Terman Age	12-0	12-11	14-1	14-1
	I. Q.	109	106	108	104
59.	Average I. Q. 105.0.				
	Examiner	E. V.	E. V.		
	Chronological Age	11-1	12-5		
	Terman Age	11-6	13-5		
	I. Q.	104	108		
60.	Average I. Q. 105.7.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	11-2	12-3	14-2	14-8
	Terman Age	11-1	13-7	14-11	16-0
	I. Q.	99	110	105	109
61.	Average I. Q. 105.6.				
	Examiner	E. V.	E. V.	L. W.	L. I. S.
	Chronological Age	12-5	13-11	14-11	15-4
	Terman Age	12-2	14-8	15-3	17-2
	I. Q.	97	105	102	112
62.	Average I. Q. 105.5.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	5-4	6-6	7-5	8-0
	Terman Age	5-6	6-6	7-8	9-3
	I. Q.	103	100	103	110
63.	Average I. Q. 105.5.				
	Examiner	E. V.	L. I. S.		
	Chronological Age	9-7	12-0		
	Terman Age	10-1	12-9		
	I. Q.	105	106		
64.	Average I. Q. 103.0.				
	Examiner	E. V.	L. I. S.		
	Chronological Age	8-8	11-2		
	Terman Age	9-0	11-5		
	I. Q.	104	102		
65.	Average I. Q. 103.0.				
	Examiner	L. W.	L. I. S.		
	Chronological Age	10-4	11-1		
	Terman Age	10-5	11-8		
	I. Q.	101	105		
66.	Average I. Q. 102.7.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	11-8	13-3	14-9	15-3
	Terman Age	11-7	14-1	15-0	15-10
	I. Q.	99	106	102	104
67.	Average I. Q. 102.5.				
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.
	Chronological Age	5-5	6-11	7-6	8-0
	Terman Age	5-5	7-3	7-7	8-5
	I. Q.	100	104	101	105
68.	Average I. Q. 99.5.				
	Examiner	E. V.	L. I. S.		
	Chronological Age	6-7	8-10		
	Terman Age	6-8	8-8		
	I. Q.	101	98		
69.	Average I. Q. 97.5.				
	Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.
	Chronological Age	7-3	8-10	9-3	9-10
	Terman Age	7-2	8-4	9-2	9-8
	I. Q.	99	94	99	98
70.	Average I. Q. 97.5.				
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.
	Chronological Age	10-9	12-0	13-10	14-4
	Terman Age	10-8	11-8	13-1	14-3
	I. Q.	99	97	95	99

TABLE VI--CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—BOYS

71. Average I. Q. 96.0.					
Examiner -----	E. V.	E. V.			
Chronological Age -----	12-3	13-9			
Terman Age -----	11-3	13-3			
I. Q. -----	99	99			
72. Average I. Q. 95.0.					
Examiner -----	E. V.	E. V.			
Chronological Age -----	11-2	12-9			
Terman Age -----	10-1	12-9			
I. Q. -----	90	100			
73. Average I. Q. 93.2.					
Examiner -----	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological Age -----	12-6	14-1	15-1	15-6	16-0
Terman Age -----	11-0	13-1	14-7	14-7	15-5
I. Q. -----	88	92	96	94	99
74. Average I. Q. 93.2.					
Examiner -----	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological Age -----	9-7	10-0	10-8	11-2	
Terman Age -----	8-2	9-3	9-8	10-7	
I. Q. -----	95	92	91	95	
75. Average I. Q. 92.0.					
Examiner -----	L. W.	L. I. S.			
Chronological Age -----	10-8	11-5			
Terman Age -----	10-2	10-2			
I. Q. -----	95	89			
76. Average I. Q. 92.0.					
Examiner -----	E. V.	L. I. S.			
Chronological Age -----	9-5	11-11			
Terman Age -----	8-6	11-2			
I. Q. -----	90	94			

the I. Q. occur. In order to illustrate this more completely the 36 children of the Five Examination Group were arranged in the order of merit on the basis of the I. Q. for the first examination. For all of the children the first I. Q. was plotted, Chart VIa and b, and the points connected by a solid line to show this array of children in the original order of increasing I. Q. The vertical scale represents the range of I. Q.'s from 80 to 100. The numbers running horizontally across the chart are the identification numbers of the children in the tables of original data. The four succeeding I. Q.'s for each child were plotted on the same vertical axis as the point for the first I. Q. and different kinds of lines drawn in order to make it possible to identify the I. Q.'s of different children at the 2d, 3d, 4th and 5th examinations. The heavy horizontal lines indicate the conventional classifications of I. Q. level, 90 to 110 being considered average ability; 110 to 120 superior, with an additional classification of very superior for 120 to 140. In this study the very superior cases were not sufficiently numerous to permit of the last classification. Accordingly, all children with a mean I. Q. of 110 or above are classed as superior.

TABLE VII
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—GIRLS

1. Average I. Q. 148.0.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological	8-3	9-4	10-4	11-4	11-10
Terman	11-6	13-5	16-4	17-1	17-7
I. Q.	139	143	158	151	149
2. Average I. Q. 146.6.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological	8-11	10-0	11-0	12-0	12-5
Terman	12-6	13-11	16-7	18-7	18-7
I. Q.	149	139	150	155	149
3. Average I. Q. 140.5.					
Examiner	L. I. S.	L. I. S.			
Chronological	8-10	9-7			
Terman	12-7	13-4			
I. Q.	142	139			
4. Average I. Q. 131.7.					
Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
Chronological	7-0	8-2	8-8	9-3	
Terman	8-8	10-5	11-3	13-6	
I. Q.	123	128	130	146	
5. Average I. Q. 130.7.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	
Chronological	9-1	10-2	11-8	12-2	
Terman	11-3	12-10	15-10	17-8	
I. Q.	123	126	136	138	
6. Average I. Q. 130.5.					
Examiner	L. W.	L. I. S.			
Chronological	6-4	7-2			
Terman	7-6	10-3			
I. Q.	118	143			
7. Average I. Q. 130.2.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological	9-6	10-7	12-1	12-7	13-0
Terman	11-0	13-7	15-11	17-8	17-8
I. Q.	115	128	132	140	136
8. Average I. Q. 130.0.					
Examiner	E. V.	E. V.			
Chronological	7-0	8-1			
Terman	9-2	10-5			
I. Q.	131	129			
9. Average I. Q. 128.8.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological	8-10	9-10	11-1	11-10	12-4
Terman	9-10	11-6	15-5	16-7	17-1
I. Q.	111	116	139	140	138
10. Average I. Q. 127.8.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological	6-6	7-5	9-0	9-6	9-11
Terman	8-2	9-2	10-8	12-9	13-8
I. Q.	125	123	119	134	138
11. Average I. Q. 125.5.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological	9-8	10-8	11-3	11-10	
Terman	10-3	13-4	15-1	16-3	
I. Q.	106	125	134	137	
12. Average I. Q. 125.0.					
Examiner	E. V.	E. V.			
Chronological	8-9	9-9			
Terman	10-8	12-6			
I. Q.	122	128			
13. Average I. Q. 124.7.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological	4-11	5-6	6-6	7-0	
Terman	6-4	6-10	8-0	8-8	
I. Q.	128	124	123	124	
14. Average I. Q. 124.6.					
Examiner	E. V.	L. S.	L. I. S.		
Chronological	10-9	12-3	13-3		
Terman	12-4	15-6	17-8		
I. Q.	115	126	133		

TABLE VII—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—GIRLS

15.	Average I. Q. 124.0.					
	Examiner	L. W.	L. I. S.			
	Chronological	5-9	6-7			
	Terman	7-4	8-0			
	I. Q.	127	121			
16.	Average I. Q. 123.5.					
	Examiner	L. W.	L. I. S.			
	Chronological	5-7	6-9			
	Terman	6-6	8-10			
	I. Q.	116	131			
17.	Average I. Q. 123.2.					
	Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
	Chronological	9-11	11-2	11-11	12-5	
	Terman	11-0	12-11	15-7	16-11	
	I. Q.	111	116	130	136	
18.	Average I. Q. 122.5.					
	Examiner	L. W.	L. I. S.			
	Chronological	5-1	6-4			
	Terman	6-6	7-6			
	I. Q.	127	118			
19.	Average I. Q. 122.4.					
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
	Chronological	8-9	9-10	11-4	11-9	12-3
	Terman	10-5	11-1	12-3	15-3	17-8
	I. Q.	119	112	108	129	144
20.	Average I. Q. 122.0.					
	Examiner	L. I. S.	L. W.	L. I. S.	L. I. S.	
	Chronological	11-5	13-1	14-1	14-8	
	Terman	13-0	16-4	18-0	18-6	
	I. Q.	113	124	128	123	
21.	Average I. Q. 121.0.					
	Examiner	E. V.	E. V.			
	Chronological	6-1	7-6			
	Terman	7-6	8-11			
	I. Q.	123	119			
22.	Average I. Q. 120.5.					
	Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
	Chronological	6-8	8-3	8-8	9-3	
	Terman	8-0	9-6	10-10	11-3	
	I. Q.	120	115	125	122	
23.	Average I. Q. 120.0.					
	Examiner	L. W.	L. I. S.			
	Chronological	5-11	7-1			
	Terman	6-8	9-0			
	I. Q.	113	127			
24.	Average I. Q. 119.0.					
	Examiner	E. V.	E. V.	L. W.		
	Chronological	7-10	8-11	10-5		
	Terman	9-7	10-9	12-0		
	I. Q.	122	120	115		
25.	Average I. Q. 118.6.					
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
	Chronological	10-0	11-1	12-6	13-0	13-6
	Terman	11-3	12-3	14-9	16-5	17-8
	I. Q.	112	110	118	126	127
26.	Average I. Q. 118.0.					
	Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
	Chronological	10-5	11-6	13-0	13-5	13-11
	Terman	11-5	13-1	15-5	17-2	17-2
	I. Q.	109	113	118	127	123
27.	Average I. Q. 117.2.					
	Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
	Chronological	8-0	9-8	10-0	10-7	
	Terman	8-10	11-2	12-2	13-0	
	I. Q.	110	115	121	123	
28.	Average I. Q. 117.2.					
	Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
	Chronological	7-7	9-2	9-7	10-2	
	Terman	9-1	10-8	10-11	12-2	
	I. Q.	120	116	114	119	

TABLE VII—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—GIRLS

29. Average I. Q. 117.0.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological	5-7	6-9	7-8	8-2	
Terman	6-6	7-8	9-0	10-0	
I. Q.	116	113	117	122	
30. Average I. Q. 116.8.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological	8-11	10-3	11-4	11-11	12-5
Terman	10-7	11-9	12-1	14-4	15-8
I. Q.	118	114	106	120	126
31. Average I. Q. 116.2.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	
Chronological	9-3	10-9	12-4	12-10	
Terman	10-9	12-5	14-1	15-5	
I. Q.	116	115	114	120	
32. Average I. Q. 116.0.					
Examiner	L. W.	L. I. S.			
Chronological	5-11	7-2			
Terman	6-2	9-2			
I. Q.	104	128			
33. Average I. Q. 115.6.					
Examiner	E. V.	L. S.	L. I. S.	L. I. S.	L. I. S.
Chronological	5-1	6-1	7-7	8-1	9-7
Terman	5-0	7-4	9-2	9-10	10-2
I. Q.	98	120	121	121	118
34. Average I. Q. 115.5.					
Examiner	L. W.	L. I. S.			
Chronological	5-4	6-7			
Terman	6-6	7-2			
I. Q.	122	109			
35. Average I. Q. 114.5.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological	9-4	10-5	11-4	11-11	
Terman	10-10	11-11	12-10	13-9	
I. Q.	116	114	113	115	
36. Average I. Q. 113.5.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological	11-6	12-5	13-1	13-9	
Terman	12-6	13-9	15-1	16-7	
I. Q.	108	110	115	121	
37. Average I. Q. 113.5.					
Examiner	E. V.	E. V.			
Chronological	6-1	7-1			
Terman	6-10	8-2			
I. Q.	112	115			
38. Average I. Q. 113.4.					
Examiner	E. V.	L. S.	L. W.	L. I. S.	L. I. S.
Chronological	6-2	7-1	8-9	9-3	9-8
Terman	7-6	8-4	9-8	10-3	10-7
I. Q.	121	117	110	110	109
39. Average I. Q. 112.0.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological	11-4	12-11	14-0	14-4	14-10
Terman	11-6	14-10	14-10	17-7	17-7
I. Q.	101	114	106	122	118
40. Average I. Q. 112.0.					
Examiner	E. V.	E. V.	L. W.	L. I. S.	L. I. S.
Chronological	9-2	9-3	10-7	11-2	11-8
Terman	9-4	10-2	11-2	12-0	14-7
I. Q.	114	109	105	107	125
41. Average I. Q. 110.5.					
Examiner	L. W.	L. I. S.			
Chronological	6-8	7-6			
Terman	7-4	8-4			
I. Q.	110	111			
42. Average I. Q. 110.0.					
Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
Chronological	9-4	10-7	10-11	11-6	
Terman	9-7	10-6	12-3	14-7	
I. Q.	102	99	112	127	

TABLE VII—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—GIRLS

43. Average I. Q. 109.0.					
Examiner	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological	7-6	8-10	10-1	10-5	11-0
Terman	8-4	9-8	10-7	11-10	11-10
I. Q.	111	109	104	113	108
44. Average I. Q. 108.5.					
Examiner	L. W.	L. I. S.			
Chronological	6-5	7-7			
Terman	6-8	8-7			
I. Q.	104	113			
45. Average I. Q. 108.0.					
Examiner	E. V.	E. V.	L. W.		
Chronological	8-8	9-9	11-0		
Terman	9-7	10-4	12-1		
I. Q.	110	105	109		
46. Average I. Q. 108.0.					
Examiner	L. S.	L. W.	L. I. S.	L. I. S.	
Chronological	12-7	14-2	15-3	15-9	
Terman	13-8	15-6	16-8	16-8	
I. Q.	108	109	109	106	
47. Average I. Q. 107.7.					
Examiner	E. V.	L. I. S.	L. I. S.	L. I. S.	
Chronological	8-11	10-3	10-8	11-2	
Terman	10-2	10-8	11-9	11-9	
I. Q.	114	104	108	105	
48. Average I. Q. 107.5.					
Examiner	E. V.	L. I. S.			
Chronological	6-3	9-9			
Terman	7-0	10-1			
I. Q.	112	103			
49. Average I. Q. 107.5.					
Examiner	E. V.	E. V.			
Chronological	9-9	11-3			
Terman	10-4	12-3			
I. Q.	100	109			
50. Average I. Q. 107.0.					
Examiner	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological	6-7	7-11	8-8	9-3	
Terman	7-0	8-4	9-9	9-9	
I. Q.	100	105	112	105	
51. Average I. Q. 107.0.					
Examiner	L. S.	E. V.	L. I. S.		
Chronological	15-7	16-9	17-8		
Terman	15-3	18-0	18-0		
I. Q.	97	112	112		
52. Average I. Q. 106.5.					
Examiner	L. W.	L. I. S.			
Chronological	6-0	7-4			
Terman	6-6	7-8			
I. Q.	106	105			
53. Average I. Q. 106.0.					
Examiner	L. W.	L. I. S.			
Chronological	6-6	7-4			
Terman	6-10	7-10			
I. Q.	105	107			
54. Average I. Q. 105.5.					
Examiner	L. W.	L. I. S.			
Chronological	5-1	6-4			
Terman	5-8	6-4			
I. Q.	111	100			
55. Average I. Q. 105.3.					
Examiner	E. V.	E. V.	L. I. S.		
Chronological	11-3	12-6	13-10		
Terman	11-1	13-0	15-10		
I. Q.	98	104	114		
56. Average I. Q. 104.5.					
Examiner	L. I. S.	L. I. S.			
Chronological	6-0	6-9			
Terman	6-2	7-2			
I. Q.	103	106			

TABLE VII—CONTINUED
ORIGINAL DATA ARRANGED IN ORDER OF MEAN I. Q.—GIRLS

57. Average I. Q. 103.5.					
Examiner -----	E. V.	E. V.	L. I. S.	L. I. S.	
Chronological -----	8-8	9-8	11-8	12-3	
Terman -----	9-8	10-5	11-4	12-2	
I. Q. -----	111	107	97	99	
58. Average I. Q. 102.7.					
Examiner -----	E. V.	E. V.	L. I. S.	L. I. S.	
Chronological -----	9-2	10-3	12-3	12-9	
Terman -----	9-8	10-9	12-0	13-3	
I. Q. -----	105	104	98	104	
59. Average I. Q. 102.6.					
Examiner -----	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological -----	7-11	9-0	10-7	10-11	11-5
Terman -----	8-2	9-9	10-3	10-9	12-4
I. Q. -----	103	108	96	98	108
60. Average I. Q. 102.5.					
Examiner -----	E. V.	L. I. S.			
Chronological -----	12-6	14-10			
Terman -----	13-0	14-11			
I. Q. -----	104	101			
61. Average I. Q. 102.5.					
Examiner -----	L. W.	L. I. S.			
Chronological -----	8-3	9-3			
Terman -----	8-4	9-7			
I. Q. -----	101	104			
62. Average I. Q. 98.5.					
Examiner -----	L. W.	L. I. S.			
Chronological -----	5-4	5-6			
Terman -----	5-2	6-6			
I. Q. -----	97	100			
63. Average I. Q. 93.8.					
Examiner -----	E. V.	E. V.	L. I. S.	L. I. S.	L. I. S.
Chronological -----	9-6	10-4	11-6	11-11	12-6
Terman -----	8-8	10-4	10-7	10-10	11-10
I. Q. -----	91	100	92	91	95
64. Average I. Q. 93.5.					
Examiner -----	E. V.	E. V.			
Chronological -----	9-8	10-7			
Terman -----	8-10	10-2			
I. Q. -----	91	96			
65. Average I. Q. 92.7.					
Examiner -----	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological -----	6-4	7-7	8-4	8-11	
Terman -----	5-10	7-0	7-9	8-5	
I. Q. -----	92	92	93	94	
66. Average I. Q. 91.7.					
Examiner -----	E. V.	L. W.	L. I. S.	L. I. S.	
Chronological -----	9-3	10-0	11-0	11-6	
Terman -----	9-4	9-6	9-9	10-2	
I. Q. -----	100	90	89	88	
67. Average I. Q. 91.5.					
Examiner -----	L. W.	L. I. S.			
Chronological -----	11-2	12-3			
Terman -----	9-8	11-9			
I. Q. -----	87	96			

It is apparent that these class names have very little real significance, as almost all of the children vary from their original classification on re-examination. A variation of only a few points in the I. Q. measuring actual mental growth or occurring as a chance error of examination would be sufficient to transfer a child from the average to the superior class. The same amount of variation might keep a child within its class if the original I. Q. has been sufficiently low. This fallacy in the use of type names has

long been recognized by careful students of individual differences, but it needs to be emphasized again because of the loose use of these terms by "Binet testers."

Inspection of the variations in each child's I. Q. as shown in Chart VI shows that the original I. Q. is only approximately constant upon successive examinations. In two cases the second, third, fourth and fifth I. Q.'s are actually below the first I. Q.; in five cases one of the later I. Q.'s is below the original one and in ten cases two or more of the later I. Q.'s are below the first. The remaining 19 cases show a general increase in I. Q., though each succeeding examination does not always give a higher I. Q. than the one preceding.

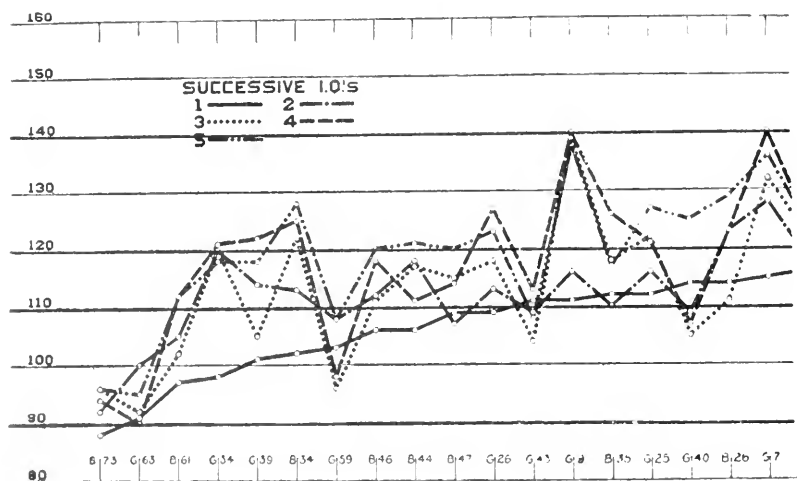
The uniform and homogeneous nature of the mean I. Q. curves in Chart IV tends to give a false impression of the individual child's successive I. Q.'s. For this reason the individual curves of the 36 children who had the largest number of examinations were plotted in Charts VII and VIII in order to show the actual variations in I. Q. that occur. A comparison of the charts for boys and girls shows a greater irregularity of development in girls, together with a tendency toward greater decrease in I. Q. at the later ages, probably due to the fact that the girls, who are more advanced in their development, can not maintain their original rates because of having passed so many of the tests at the upper limit of the scale. The fairly consistent and uniform curve which would correspond to an absolutely stable I. Q. is not exemplified in any of the girls' curves and in only two of the boys' curves, Nos.¹ 3 and 17. A gradual steady increase in I. Q. is observable in some instances, as for example in the curves of boys Nos. 25, 34 and 61 and girl No. 5. Examples of curves showing a steady rise followed by a decrease in I. Q. are: for boys Nos. 11 and 8 and for girls Nos. 1, 7 and 26. Curves showing marked irregularities with the I. Q. alternately increasing and decreasing are: for girls Nos. 63 and 39, and for boys Nos. 47 and 33.

While many of these changes are well within the 5 point limit of safety, a sufficient number show deviations of such magnitude² that extreme care should be exercised about making any dogmatic statements in regard to what a child's future status will be. For

¹These numbers correspond to the numbers assigned the children in the tables of original data.

²Cf. Root, W. T. Two Cases Showing Marked Change in I. Q., *J. of Appl. Psychol.*, (5) 1921, 156-158.

CHART VIa

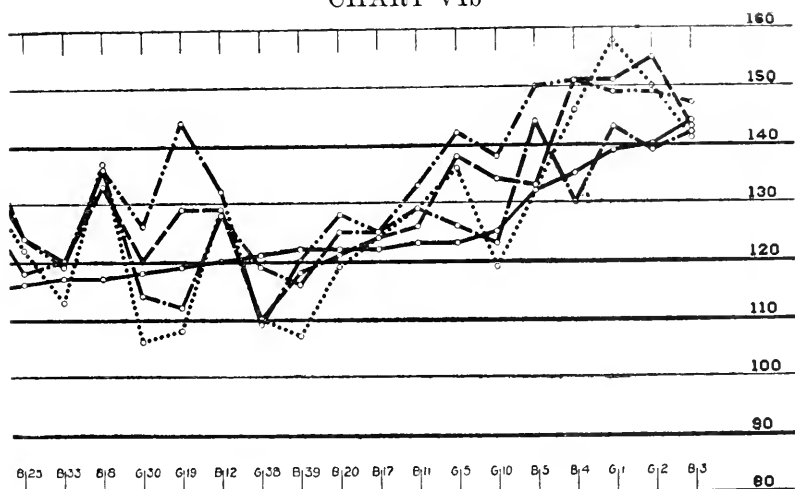


example, Girl No. 9 (Chart VIb) whose I. Q. in the first test was 111, obtained on four subsequent tests 116, 139, 140 and 138. A careful study of this case showed no difference in the method of examination and no unusual physical condition aside from the adolescent physiological acceleration.

No doubt these fluctuations in general mental achievement were modified more or less by such factors as time of day, health conditions at the time of the examination, fatigue, interest of the child in a particular examination, and changes in the home and school environment. Similarly conditioned changes in attitude on the part of the examiner might also have their effect.

2. *Deviations of Individuals from their Mean I. Q. Level.* In order to determine other causes of the variability that is apparent from an inspection of the individual I. Q. curves, each child's deviation in I. Q. for every examination was calculated from his mean I. Q. in all of his examinations. For example, one boy of very superior general intelligence showed on 5 examinations, deviations of $+4$, -1.6 , -1.6 and $+3.4$; another boy of average ability showed very different deviations. It is possible that these deviations are influenced by chance errors of examination. Nevertheless it is apparent that the size of these deviations depends not only on the real (inherent) variability of the child, but also upon the size of his mean I. Q. A large deviation on a high I. Q. may

CHART VIIb



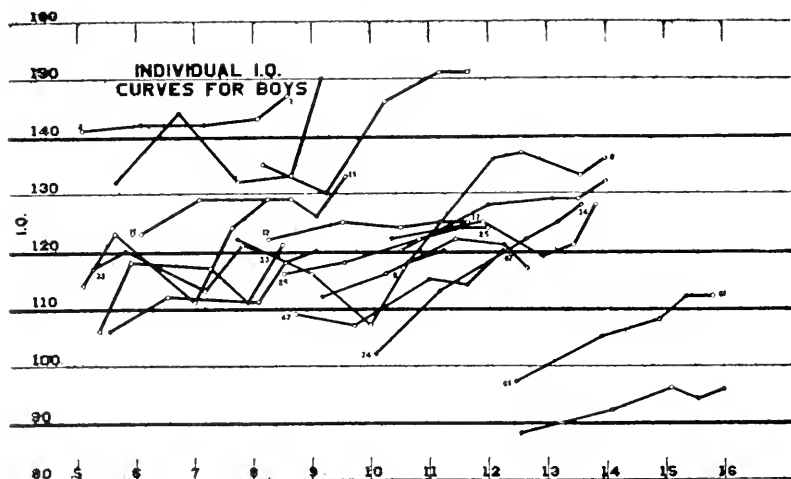
not be very different from a small deviation on a low I. Q. In order to make all deviations comparable they were expressed as percentages of each child's mean I. Q. These percentages were then averaged for each child and the mean of the individual

	Boys		Girls	
	Mean	P. E.	Mean	P. E.
Superior I. Q. 110+	4.48	.53	6.92	.78
Average I. Q. 90-110	2.65	.23	3.80	.29
Total	3.99	.38	5.95	.57
Under 10 at last examination	3.60	.31	5.14	1.19
Over 10 at first examination	4.85	1.26	7.09	1.36

variabilities obtained for various classes of subjects (Table VIII). The mean for all the boys was $3.99 \pm .38$; for all of the girls $5.95 \pm .57$. The mean for the superior boys was $4.48 \pm .53$, for superior girls $6.92 \pm .78$. The mean for average boys was $2.65 \pm .23$; for average girls $3.80 \pm .29$.

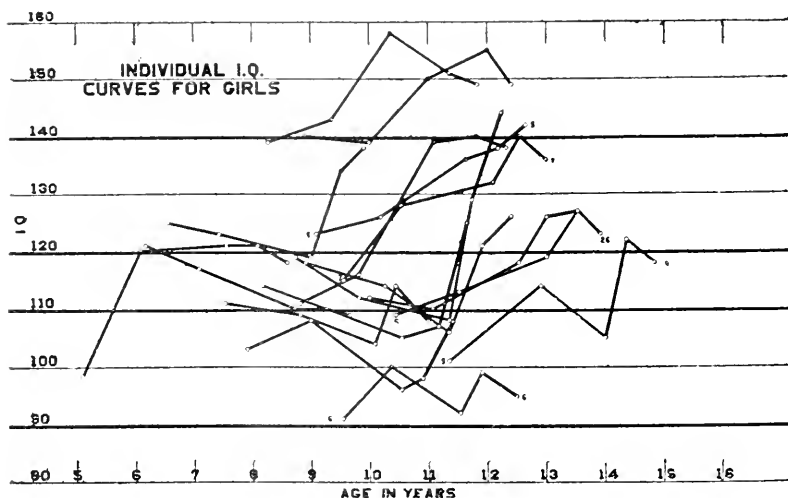
To determine whether chronological age was also a factor tending to make the individual vary from his I. Q. level, means were obtained for boys and girls who were under 10 years of age at

CHART VII



the last examination and for those over 10 at the first examination. The mean for the boys who were under 10 years of age at their last measurement was $3.60 \pm .31$; for boys who were over 10 at their first measurement was 4.85 ± 1.26 . The mean for girls who were under 10 years of age at their last measurement was

CHART VIII



5.14 ± 1.19 and for those over 10 at their first measurement was 7.09 ± 1.36 .

The P. E. of all these means is sufficiently large to obscure the difference between the means for the group under comparison. There is, nevertheless, a constant tendency in all the groups for the girls to be more variable than the boys, for the superior children to be more variable than the average children and for the older children to be more variable than the younger.

3. *Differences in I. Q. at Successive Examinations.* One method of studying the stability of the I. Q. is that of direct observation of the changes that take place on re-examination. For every possible combination of examinations in the four groups the differences of I. Q. for each child were computed and the increases in I. Q. tabulated as positive and the decreases as negative. These positive and negative variations were then grouped by class intervals of 5 point differences in I. Q. and the per cent of cases showing each amount of difference calculated. For example, 16 of the 74 boys who had two examinations showed a decrease of 0 to 5 points on the second examination; i. e., 21.6% showed this amount of negative difference. The percentage distribution of the differences, exclusive of the cases showing no differences, is shown for boys and girls in Table IX and Chart IX.

Between the first and second examination the percentage distribution of differences approximates the normal frequency curve with the greatest number of cases showing a positive change within the 5 point range. As the interval between examinations increases the effect of the repeated examinations intervening becomes apparent in a shift toward the positive end of the scale. Although there is no large sex difference, the girls have a wider range of deviation, particularly those of the Four and Five Examination Groups, where the last examination fell for the majority of the children within the period of adolescence.

The mean change in I. Q. was found to be

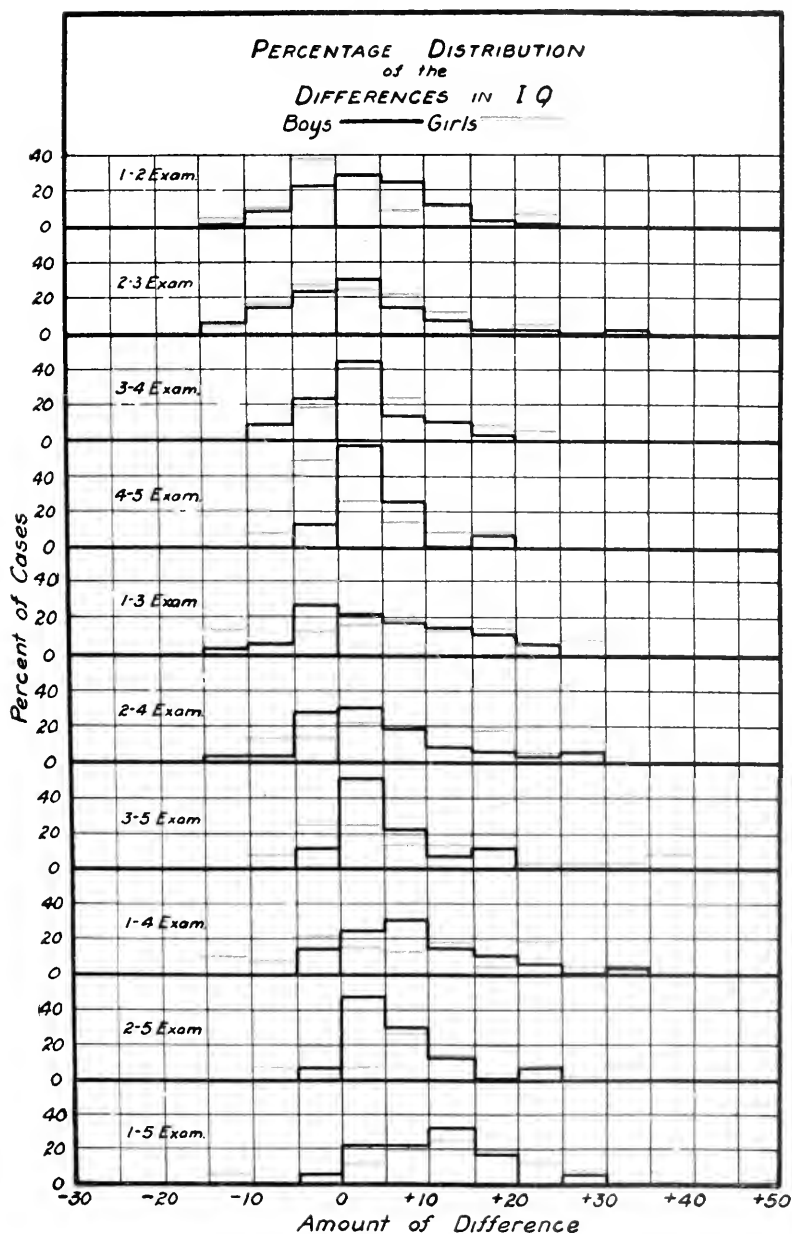
Examination	1-2		2-3		3-4		4-5	
Deviation	—	+	—	+	—	+	—	+
Boys	4.61	7.39	5.12	7.60	3.42	7.27	2.50	5.14
Girls	4.53	7.32	5.17	8.00	3.75	6.79	3.44	7.75

Here there is evident a shift in the relation between negative and positive changes as the number of examinations children have taken grows larger.

TABLE IX
Percentage Distribution of the Differences in Intelligence Quotients

BOYS		1-2	2-3	3-4	4-5	1-3	2-4	3-5	1-4	2-5	1-5
Examination											
Amount of Differences in Intelligence Quotients											
0-5	21.6%	28.3%	23.2%	30.3%	12.5%	21.4%	21.5%	50.0%	13.5%	5.9%	5.3%
5-10	8.1	24.3	13.9	13.9	2.5	16.6	2.5	22.2	29.7	29.4	21.0
10-15	1.4	12.1	4.6	6.9	2.5	14.2	2.5	5.5	13.5	11.7	31.5
15-20	2.7	2.3	2.3	2.3	6.2	9.5	5.0	11.1	10.8	5.9	15.7
20-25	1.4					4.8	2.5		5.4		5.3
25-30							5.0		2.7		
30-35											
Total	31.1%	68.8%	41.7%	57.9%	12.5%	66.5%	32.5%	88.8%	33.5%	94.0%	5.3%
No. of cases	23	51	18	25	2	14	13	2	5	1	1
Zero cases	2		2		3	3	1	1	4	2	0
No. in group	76		45		19	45	41	19	41	19	19
GIRLS											
0-5	36.3%	27.2%	25.6%	23.1%	47.1%	14.2%	11.8%	23.5%	19.5%	18.7%	5.9%
5-10	9.1	7.5	15.3	20.5	5.9	16.6	11.8	11.7	5.6	6.2	11.7%
10-15	3.0	10.6	2.6	10.2	8.3	9.5	17.6	5.9	8.3	12.5	17.6
15-20	1.5				5.6	11.9	14.7	17.6	2.8	18.7	17.6
20-25					2.8	2.4	2.9		16.6	6.2	5.9
25-30	4.5		2.6			4.8	2.9		2.8		
30-35								5.9	2.8	6.2	
35-40											
Total	48.4%	51.3%	43.5%	56.4%	53.0%	50.4%	23.6%	70.4%	33.4%	74.8%	11.8%
No. of cases	32	34	17	22	9	17	8	5	12	4	2
Zero cases	1		3		0	0	3	0	1	1	0
No. in group	67		42		17	42	37	17	37	17	17

CHART IX



These I. Q. changes cannot, however, be taken at their face value, since a large change on a high I. Q. may not be more significant than a small change on a low I. Q. In order to make all changes comparable, the mean gains and losses from the first to second, second to third, third to fourth, and fourth to fifth examinations were expressed as per cents of the mean I. Q. at the 1st, the 2d, the 3d or the 4th examination, depending on the comparison being made. The material was also arranged to give a separate mean for average and superior children. The per cents of change in I. Q. follow:

Examination	1-2		2-3		3-4		4-5	
Deviation %	—	+	—	+	—	+	+	—
Superior								
Boys	4.3	7.0	5.1	6.5	3.1	7.5	2.0	4.2
Girls	3.5	8.5	3.5	7.1	4.1	5.8	2.5	6.3
Average								
Boys	3.9	5.0	3.0	6.5	2.3	4.8	0	1.9
Girls	5.0	5.5	6.8	6.3	2.9	5.7	5.0	7.0

This tabulation shows a slightly greater per cent of change, especially in the positive direction, for superior children, due probably to the fact that superior children profit more readily by practice.

It would be of great interest to know what is the effect of chronological age upon the change in I. Q., but the writers have been unable to devise any reliable method of determining the facts from the data available. The computation of the mean I. Q. change at each chronological age is not permissible because of the varying amounts of practice. For example, at age 8 there are the first examinations for some children, and also the second, third, fourth and fifth for others. Such tabulation of cases with reference to the age at the first test would, moreover, class the children whose second examination was given after a considerable time, with those who had been re-examined at a shorter interval, and would tend to obscure any characteristic chronological changes occurring. It would seem that the question of whether older children show a different amount of I. Q. change than younger children could be solved only by a special experiment with a series of examinations beginning at a uniform age, on children of equal intelligence, and applied at uniform intervals.

No determination can be made in this study of the effect of the interval separating the examinations. The change from the 1st to

the 5th I. Q. cannot be compared with the change at other intervals because of the different amounts of practice intervening.

Terman (26) 1919, p. 138, used the method of I. Q. comparison described as follows:

"Tests have been given to 315 children in the vicinity of Stanford University. To 46 of these children, three or more tests have been given. In case of a child tested several times each test has been compared with each of the others, for example, the first test with the second, third, and fourth, separately, the second test with the third and fourth separately, and the third test with the fourth. This gives in all 435 I. Q. comparisons."

Terman (26) p. 140, reports that his comparisons show: "that it makes little difference whether the child was bright, average or dull, how long an interval separated the tests or what the age of the child was at the earlier test. The majority of the changes are for all groups relatively small. . . .

"The central tendency of change is represented by an increase of 1.7 in I. Q.: the middle 50% of change lies between the limits of 3.3 decrease and 5.7 increase; the probable error of a prediction based on the first test is 4.5 points in terms of I. Q."

The method of I. Q. comparison as used by Terman is open to the objections stated above. The I. Q.'s obtained after repeated examinations are pooled with those from a first examination, and the average tendency of change computed on the basis of these data. It seems to us that the differences in practice would make it inadvisable to pool these examinations.

Such a tabulation of change in I. Q. with reference to the age at the first test would, moreover, afford no opportunity for the special characteristics of the adolescent period to show themselves if they existed. As has been demonstrated in connection with the mental growth curves, and the physical growth curves, boys and girls have a period of adolescent acceleration at different chronological ages, and children of superior and average mental and physical status show a similar difference. A pooled classification of these different classes of data tends to destroy any characteristic chronological age changes in I. Q.

We have felt that the solution of these problems would not be obtained by the use of this method. The 695 separate I. Q. comparisons afforded by the data in this study would have been reduced to a very small number if the comparisons had been made only with children of the same chronological age, sex, I. Q. level, and physical status.

4. *Intercorrelations.* The stability of the I. Q. can be investi-

gated by another means than that of noting the size of the differences in I. Q. and calculating the central tendency of change. The similarity in the relative rankings of children on successive examinations can best be studied by means of the method of correlation. Although several writers have reported correlations between two examinations no data have so far been presented in the literature to show the intercorrelations of several examinations given on the same group of children for several years. From such an array of correlations one can determine whether the majority of children maintain at a later examination their relative position above or below the mean of their group and tend to deviate from this mean by approximately the same amount after several years interval. The accuracy of the prediction is conditioned by the size of the correlations. A high correlation between the I. Q.'s obtained by a group of children on two examinations would mean considerable stability in I. Q. and the possibility of predicting with a high degree of accuracy the future status of children of any I. Q. level.

For this method of investigating the evenness of the mental growth there were calculated Pearson coefficients of correlation for four groups of children. One group consisted of 56 children who had been examined twice; the coefficient of correlation for the two examinations was $+.81 \pm .03$. Another group consisted of 51 children who had been examined three times; the coefficient for the first and second was $+.76 \pm .04$; for the first and third $+.69 \pm .05$; for the second and third $+.83 \pm .03$.

It was possible to give a fourth examination to all but 9 of this group. The coefficients for this smaller group were, for the first and second examinations $+.79 \pm .04$, for the second and third $+.86 \pm .03$, for the third and fourth $+.93 \pm .02$, for the first and third $+.77 \pm .04$, for the second and fourth $+.82 \pm .03$, and for the first and fourth $+.72 \pm .05$.

The last group of 36 children was given five examinations. The correlation between the first and second was $+.85 \pm .03$, between the second and third $+.85 \pm .03$, between the third and fourth $+.91 \pm .02$, between the fourth and fifth $+.92 \pm .02$, between the first and third $+.74 \pm .05$, between the first and fourth $+.78 \pm .04$, between the first and fifth $+.82 \pm .04$, between the second and fourth $+.80 \pm .04$, between the second and fifth $+.82 \pm .04$, and between the third and fifth $+.84 \pm .03$.

TABLE X
INTERCORRELATIONS OF INTELLIGENCE QUOTIENTS FOR TWO, THREE, FOUR AND
FIVE EXAMINATION GROUPS

[illegible]

The coefficients (Table X) are uniformly high and reliable with low probable errors, ranging from $+.72 \pm .05$ to $+.93 \pm .02$. The coefficients of correlation for near-lying examinations, that is, two examinations with none intervening, are highest, the mean being $+.88$. For three correlations with one intervening examination the mean is $+.79$. For the two with two intervening examinations the mean is $+.80$, and for the one with three intervening examinations the correlation is $+.82$. Although the coefficient is highest for near-lying examinations there is no tendency for the correlation to decrease with increase of interval.

TABLE XI
PERCENTAGE OF CHILDREN TESTED BY SAME EXAMINER

[illegible]

It is possible that the size of the correlation might be influenced by the fact that a number of children were examined on both occasions by the same examiner. A study of Table XI shows that although for the two highest coefficients $+.93$ and $+.92$, 100% of the examinations were made by the same examiner, the next highest coefficient, $+.91$, showed only 40% by the same examiner. Other high coefficients are $+.86$ with 18.6% of the examinations and $+.85$ with 91.4% of the examinations by the same examiner. A correlation of $+.85$ was also found where no child had been examined twice by the same examiner and a coefficient as low as $+.76$ was obtained with 77.8% of the examinations made by the same examiner. It would appear then that the personal equation of the examiner although of some influence is not the important factor in the size of the correlation.

In general it is not justifiable to compute correlations for a group with such a wide range in chronological age. Such a procedure would tend to raise the correlation. The correlations between I. Q.'s are probably not subject to criticism from this point of view, since the I. Q. compensates for the difference in the chronological ages.

Considerable doubt has been thrown by K. Pearson (Proc. Roy. Soc., 1897 (60) 489.) on the justifiability of correlating ratios. From this point of view the calculation of correlations between I. Q.'s may result in spurious correlation. This method is, however, the only feasible one at this stage in the development of the problem.

In each group the highest correlations occur between near-lying examinations at the end of the series of examinations where the children were better adjusted to the situation and had apparently reached a certain stability of position within the group.

For comparison it is of interest to note the size of the correlations obtained by other examiners. These were: Bobertag, $+.95$ (Binet); Terman, $+.93$ (Stanford); Cuneo and Terman, $+.95$, $+.94$, $+.85$ (Stanford); Rosenow, $+.82$ (Binet and Stanford); Rugg and Colloton, $+.84$ (Stanford).

5. *Probable Error of Estimate.* Knowing the value of the coefficient of correlation between the first and any succeeding test, we can predict what any future I. Q. would be and compute the difference between the I. Q. as predicted and as actually obtained, or the error of estimate.

TABLE XII
DIFFERENCE BETWEEN THE OBTAINED AND PREDICTED INTELLIGENCE QUOTIENT ON 2D, 3D, 4TH AND 5TH EXAMINATIONS.

No.	First		Second		Third		Fourth		Fifth	
	Obtained I. Q.	Predicted I. Q.	Diff. between Obtained and Predicted I. Q.	Obtained I. Q.	Predicted I. Q.	Diff. between Obtained and Predicted I. Q.	Obtained I. Q.	Predicted I. Q.	Diff. between Obtained and Predicted I. Q.	Obtained I. Q.
1.....	139	137.90	5.10	158	141.00	17.00	151	145.16	5.84	149
2.....	140	138.70	.30	150	141.90	8.10	155	146.05	8.94	149
3.....	144	141.80	.20	141	145.50	4.50	143	149.66	6.66	147
4.....	135	134.80	4.80	146	137.40	8.60	151	141.56	9.44	151
5.....	132	132.50	11.50	132	134.70	2.70	133	138.85	5.85	150
6.....	123	125.40	.60	136	126.60	9.40	138	130.76	7.24	142
7.....	117	120.80	15.20	137	121.20	15.80	133	125.36	7.64	136
8.....	115	128.10	8.80	132	119.40	12.60	140	123.56	16.44	135
9.....	123	125.40	3.60	129	126.00	2.40	126	130.76	4.76	133
10.....	111	116.10	.10	139	123.90	23.30	140	119.96	20.04	138
11.....	120	123.10	4.90	129	123.90	5.10	129	128.06	1.10	132
12.....	125	127.60	4.60	119	128.40	9.40	134	132.56	1.44	138
13.....	122	124.70	.30	124	125.70	1.70	124	129.80	5.86	125
14.....	122	124.70	.30	119	125.70	6.70	121	129.86	8.86	128
15.....	116	120.00	2.00	122	120.30	1.70	124	124.46	.46	124
16.....	122	118.70	8.70	107	125.70	18.70	118	129.86	11.86	120
17.....	117	120.80	.80	113	121.20	8.20	120	125.36	5.36	119
18.....	112	116.90	.90	122	116.70	5.30	121	120.86	.14	117
19.....	114	118.40	4.60	111	118.50	7.50	123	122.66	.34	126
20.....	112	116.90	6.90	118	116.70	1.30	126	120.86	5.14	127
21.....	119	122.30	10.30	108	123.00	15.00	129	127.16	1.84	144
22.....	109	114.50	1.50	118	114.50	4.00	127	118.16	8.84	123
23.....	102	109.10	3.90	122	107.70	14.30	125	111.86	13.14	128
24.....	98	105.90	14.10	120	104.10	15.90	121	108.96	12.74	118
25.....	118	121.50	7.50	106	122.10	16.10	120	126.96	6.96	126
26.....	121	123.90	4.90	110	124.80	14.80	110	128.96	18.96	109
27.....	106	112.20	5.80	117	111.30	5.70	111	115.46	4.46	121
28.....	106	112.20	.20	111	111.30	.30	118	115.46	2.54	120
29.....	109	114.50	7.50	115	114.00	1.00	114	118.16	4.16	120
30.....	101	106.30	5.70	105	106.80	1.80	122	110.96	11.04	118
31.....	114	118.40	9.40	105	118.50	13.50	107	122.66	15.66	125
32.....	111	116.10	7.10	104	115.80	11.80	113	119.86	6.96	108
33.....	97	105.30	.20	102	103.20	1.20	112	107.36	4.64	112
34.....	103	106.80	1.80	96	108.00	12.60	98	115.76	14.76	108
35.....	91	100.50	.50	92	97.80	5.80	90	101.96	11.96	95
36.....	88	98.10	6.10	90	95.10	.90	94	99.26	5.26	96
Mean			4.7			8.5			7.9	
P. E. of Estimate		±4.2			±7.0			±6.2		±5.5

Our data for five consecutive examinations of 36 children have been used to make a comparison of the I. Q.'s actually obtained and the I. Q.'s predicted by means of the regression equation:

$$y_1 - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x_1 - \bar{x}),$$

where y_1 = the I. Q. to be predicted, \bar{y} = the mean of the obtained (later) I. Q.'s, \bar{x} = the mean of the obtained first I. Q.'s, x_1 = the individual I. Q. on the first test, and σ = the standard deviation of the x or y series.

The equation can more conveniently be used in the simplified form:

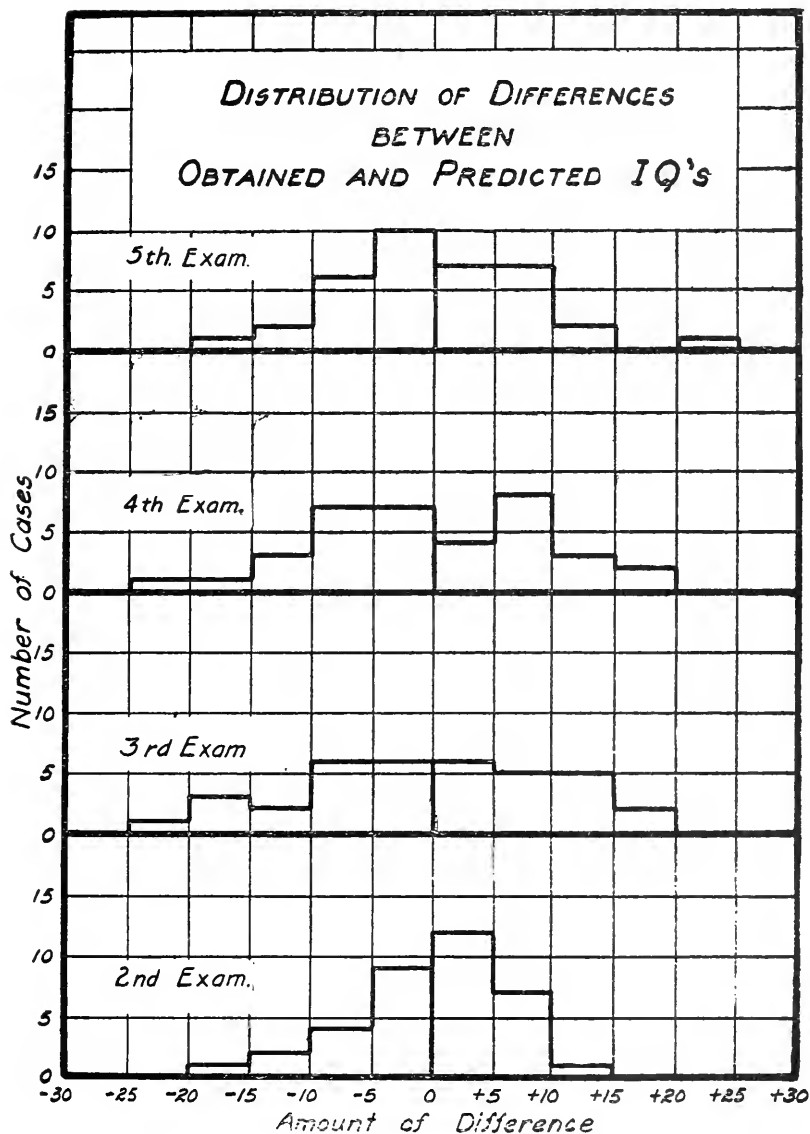
$$y_1 = r \frac{\sigma_y}{\sigma_x} (x_1) + (\bar{y} - r \frac{\sigma_y}{\sigma_x} \bar{x}),$$

The quantity $r \frac{\sigma_y}{\sigma_x}$ is a constant through a whole prediction series, a different constant being used for each of the four prediction series (second, third, fourth and fifth I. Q.'s from first

I. Q.'s). The quantity $\bar{y} - r \frac{\sigma_y}{\sigma_x} \bar{x}$ is also a constant in each of these four prediction series, which reduces the formula to $y_1 = k(x_1) + k_1$. For example, by substituting the constants for the prediction of the second I. Q. one obtains $y_1 = .78(x_1) + 29.5$. For the prediction of the third from the first I. Q.: $y_1 = .90(x_1) + 15.9$.

TABLE XIII								
DISTRIBUTION OF DIFFERENCES BETWEEN OBTAINED AND PREDICTED I. Q.'s (Errors of Estimate)								
Examination	2		3		4		5	
Amount of I. Q. Difference	Number of Cases							
0-5	—9	+12	—6	+6	—7	+4	—10	+7
5-10	—4	+ 7	—6	+5	—7	+8	— 6	+7
10-15	—2	+ 1	—2	+5	—3	+3	— 2	+2
15-20	1	0	—3	+2	—1	+2	— 1	0
20-25	0	0	—1	0	—1	0	0	+1

CHART X



For the prediction of the fourth from the first I. Q.: $y_1 = .90(x_1) + 20.1$. For the prediction of the fifth from the first I. Q.: $y_1 = .91(x_1) + 21.7$.

By the use of this formula the second, third, fourth and fifth I. Q.'s for each child were predicted and the differences between

the predicted I. Q.'s and the I. Q.'s actually obtained at each of these examinations (the errors of estimate) calculated, together with the mean of the differences for the group as a whole. The I. Q.'s as actually obtained and as predicted are shown in Table XII. The distribution of the differences between obtained and predicted I. Q.'s is shown in Table XIII and Chart X.

On the average the prophesied second I. Q. differs from the obtained second I. Q. by 4.7 points, P. E. $\pm .5$, i. e., the chances are equal that the average for the differences between the predicted and obtained I. Q.'s will not be less than 4.2 or greater than 5.4. The average difference between the predicted and obtained third I. Q. or the average of the errors of estimate is 8.5; between the predicted and obtained fourth I. Q. is 7.7 and between the predicted and obtained fifth I. Q. is 6.3. The mean interval between the second and first examination was approximately 13 months; between the third and first was 28 months; between the fourth and first was 36 months and between the fifth and first 41 months.

While Table XII shows for each prediction series the most probable predicted I. Q. for each child, a better sampling from a larger number of cases might have resulted in another predicted I. Q. In other words, while 137.9 is the proper estimate for the second I. Q. for case 1, the probable error of estimate gives the number of points variation above or below this estimate that will take in 50% of all the other possible estimates. Knowing the value of the 4 coefficients of correlation involved, one can calculate the probable error of estimate for each of the prediction series by means of the formula $P. E. = .6745 \times \sigma \text{ var. } \sqrt{1-r^2}$. This formula gives as a probable error of estimate for the prediction of the second from the first I. Q. ± 4.2 , for the prediction of the third from the first I. Q. ± 7.0 ; for the prediction of the fourth from the first I. Q. ± 6.2 ; for the prediction of the fifth from the first I. Q. ± 5.5 . The P. E. of estimate of the second from the first is ± 4.2 as previously stated, i. e., the chances are equal that the true predicted second I. Q. will not vary from the calculated I. Q. by more than ± 4.2 . The chances that the true predicted I. Q. will not vary from the calculated I. Q. by more than ± 8.4 (or 2 P. E.) are 1802 in 10,000 or 1 chance in every 4.5. The chances that the true predicted I. Q. will not vary from the calculated by more than ± 12.6 are 434 in 10,000 or the chances that a deviation greater than ± 12.6 would occur are 1 in 22. The same chances of

error per 10,000 on 2 P. E. and 3 P. E. exist for the other prediction series, the only difference in each case being the size of the P. E. The P. E. of estimate for the second examination is very nearly the same as that reported by Rosenow (20) which was 3.988.

The size of the P. E. obviously depends on the size of the coefficient of correlation for the particular comparison involved. At first thought one might expect that an increase of interval between the examinations would result in a larger error of estimate. An increase in the probable error of estimate was, in fact, observed to take place in the prediction of the third from the first, where the interval was lengthened by one year. As was noted in connection with the correlations, however, the coefficient does not decrease regularly with an increase of the interval, but reflects the general habituation and improvement that has taken place and the tendency for each individual to find and remain at his characteristic level.

The calculation of the regressions and of the probable errors of estimate is of no special significance for this particular group, since the later I. Q.'s are already known. The real value of the procedure lies in utilizing the knowledge in regard to the correlation between earlier and later examinations for predicting the later I. Q. of other children who have received only the earlier examination. Chart X shows there is a conspicuous increase in the positive and a decrease in the negative differences observable where the group has had considerable opportunity for becoming adjusted to the examinations. It is not possible from the data at hand to make an exact determination of the amount of error of prediction for various intervals of examination since all of the children in this group have had repeated measurements in between, which influences the size of the correlations for the longer intervals. In order to determine how accurately one may predict a child's I. Q. one year later, two years later, etc., the correlations will have to be obtained on a sufficient number of children at each examination interval without intervening practice. In the absence of such long-time data, one can say that it is possible to predict a child's I. Q. with a probable error of from 4 to 7 points. Larger amounts of error would of course occur at the extremes of distribution. That such extreme variations do occur is shown by numerous cases in Table XII; for example in the

case of number 10, a difference of 23.2 exists between the predicted and obtained third I. Q.

The concept of a stable I. Q. involves a supplementary concept of a sort of initial acceleration or impetus of mental growth which predetermines the rate and level at which mental progress takes place and results in an approximately constant I. Q. The intelligence quotient could not, however, remain constant if serious fluctuations in the individual's rate of mental growth occurred.

If it should be proven that at certain ages children normally grow at an increased rate, the usefulness of the I. Q. would be considerably limited. It would always be of value still in determining the relative mental status of children of the same age but it would lose much of its prestige as a convenient diagnostic instrument for predicting the status of a child at later stages of its mental growth. In a previous chapter we have shown that considerable fluctuation in the rate of mental growth occurs, notably a sharp rise in the mental age curve at the approach of adolescence. This general intellectual renaissance is apparently a function of physiological age, occurring earlier in girls than in boys and earlier in children of superior intellectual endowment than in those of merely average ability. The inevitable result of this phenomenon is an increased I. Q. which in many cases could not have been predicted from the child's intellectual status at an earlier age and which would be a very unsafe basis in certain instances for inferring at the age of puberty what his earlier I. Q. had been. Prediction would still be possible, however, if one had a complete knowledge of the normal irregularities in mental growth at different ages.

SUMMARY AND CONCLUSIONS

1. The tabulated results of individual cases show that the I. Q. is only approximately constant during successive examinations.
2. Considering each child's deviation from his mean I. Q. expressed as a per cent of his mean I. Q. there is a tendency for the girls to be more variable than the boys, for the superior children to be more variable than the average children, and for the older children to be more variable than the younger.
3. Considering the difference between the first and second examination the larger number of cases show a difference of less than five points (— or +) in I. Q.; between the first and other

later examinations with intervening practice, many more cases show greater amounts of difference, the positive differences becoming more and more marked.

4. With the change expressed as a per cent of the previous I. Q. there is a slightly greater change in the positive direction for superior children, due probably to the fact that these profit more readily by practice.

5. No final determination can be made of the effect of chronological age or of the interval between examinations on the change in I. Q.'s.

6. The coefficients of correlation between all examinations within the four groups are high and reliable, ranging from $+ .72 \pm .05$ to $+ .93 \pm .02$, showing that they may be used as a basis for prediction. The correlations are probably only slightly modified by the personal equation of the examiners.

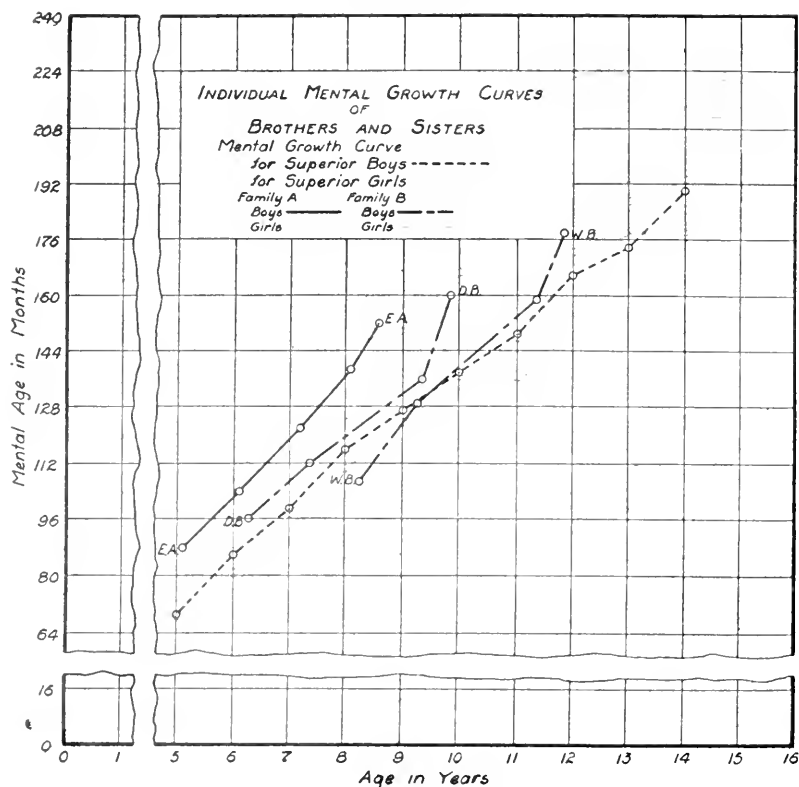
7. The value of the probable error of prediction lies in utilizing the knowledge in regard to the correlation between earlier and later examinations for predicting the later I. Q. of other children who have received only the earlier examinations. The P. E.'s of estimate range between 4.2 and 7.0 for the prediction of the second, third, fourth and fifth examination from the first.

III. THE RELATION BETWEEN PHYSICAL AND MENTAL GROWTH

1. *Data.* During the time that the psychological examinations were being made, physical measurements and x-ray photographs were taken with a view to analyzing the physical status and development of the children. A description has been given in an earlier study of the technique of taking the height and weight measurements and determining the area of the exposed surface of the carpal bones which serves as an index of anatomical development and is closely related to the physiological changes with their accompanying physical and mental phenomena. Mental measurements were also available for the children, some made on the same day as the physical examinations and others at varying intervals with a few separated by as long a time as six months.

2. *Resemblances in the Mental and Physical Development of Brothers and Sisters.* Among the children measured in the school in which our data were collected there happened to be a number

CHART XI



who were related to each other. Chart¹ XI shows the individual mental growth curves of two families in each of which three members had been given repeated measurements. Family A includes a boy No.² 3, and two girls, Nos. 2 and 20, two of whom are superior to the mean for the superior children of this study. Family B includes two boys, Nos. 10 and 40, and one girl, No. 39. These children are closer to the mean, and the girl is below it for a considerable part of its course. The members of Family A show a certain resemblance in the smooth and even rise of their growth curves, whereas the curves for Family B are more irregular and L. B. even shows periods of no measureable mental growth. There will be noted a similarity in the general trend

¹The norms on this chart are the mean for the superior and average children in this study.

²These numbers correspond to those assigned to individuals in the tables of original data.

of the mental growth curves of the brothers in Family B, and also of the sisters in Family A.

3. *Mean Mental Age of Physiologically Accelerated and Retarded Children.* The children included in this study were divided into 4 groups on the basis of general physical development. Group 1 consisted of the boys whose height and weight were above the norms for their age, and Group 2 of the boys whose height and weight were below the norms, or very close to the norms in one or the other of these two measurements. Group 1 consisted then of physiologically accelerated boys and Group 2 of physiologically retarded boys, since it has been shown by Baldwin (1) and (3), that height and weight are closely correlated with physiological maturation. This division was made on the basis of the physical measurements without knowledge of the mental age of the child. A similar division into two groups was made for the girls.

The corrected mental ages of the children in each of the four groups were then averaged for each chronological age as shown in Table XIV. The mean mental age of physiologically acceler-

TABLE XIV				
MEAN MENTAL AGE IN MONTHS OF PHYSIOLOGICALLY ACCELERATED AND RETARDED BOYS AND GIRLS				
Chronological Age	Boys		Girls	
	Accelerated	Retarded	Accelerated	Retarded
5	72.0	62.8	74.4	57.6
6	89.4	83.2	81.3	79.0
7	101.3	97.1	99.9	95.0
8	118.2	110.8	114.6	107.0
9	131.1	120.3	128.6	119.1
10	142.4	131.0	141.1	131.0
11	155.3	137.6	151.2	144.3
12	171.1	150.1	176.7	168.2
13	179.0	158.4	(182.5)	189.2
14	194.2	166.2	194.9	183.7

ated boys is uniformly higher than the mean mental age of retarded boys. For the girls the same holds true with the exception of age 13, where the mean (printed in parenthesis) is too low because of the inclusion of the measurements of some girls who were of superior intellectual ability but of the very tall, thin type.

This table confirms the findings of other investigators summarized in (2), who in general agree that superior mental development accompanies superior physical development as a rule. The first investigation to trace the correspondence between pedagog-

ical acceleration and physical development by means of consecutive school marks and physical measurements was made by Baldwin (1) in 1914. The present study is the first to determine for the same individuals the relation between general physical status and mental growth as indicated by consecutive intelligence examinations.

4. *The Relation between Physical Traits and Mental Age.* A correlation between height and mental age previously reported by Baldwin (2) was $+.71 \pm .04$ for boys and $+.62 \pm .05$ for girls. In the present study the particular mental age selected for each child was the one which had been determined nearest to the time of physical measurement. In no case was there more than a few months interval between the physical and mental measurement. The correlations obtained between height and mental age are for 72 boys $+.84 \pm .02$, and for 61 girls $+.89 \pm .02$. The correlation between weight and mental age by Baldwin (2) was for boys $+.68 \pm .04$ and for girls $+.56 \pm .06$. In the present study the correlations for weight and mental age are higher, that is, for boys $+.86 \pm .02$ and for girls $+.77 \pm .04$.

The significance of the growth of the carpal bones in relation to general physical development was first emphasized by Rotch in 1910 and is summarized by Baldwin (3). In order to determine the relationship between anatomical age as indicated by the comparative development of the carpal bones and mental development as shown by the mental age rating, Pearson coefficients of correlation have been worked out by us. These coefficients give the first determination of the interdependence of these physical and mental traits. The coefficient of correlation between mental age and an index of anatomical age, (exposed area of the carpal bones of the right wrist) was for 54 boys $+.873 \pm .021$; for 50 girls $+.869 \pm .023$.

Earlier correlations between height and weight and the exposed area of carpal bones for a group of children were reported by Baldwin (3). The correlations between height and total exposed area of carpal bones of the right wrist were for boys $+.88 \pm .03$ and for girls $+.73 \pm .05$. The correlation between weight and area of carpal bones was for boys $+.76 \pm .05$ and for girls $+.77 \pm .05$. For this study the correlations between height and weight for boys was $+.92 \pm .01$, and for girls $+.89 \pm .02$.

As has previously been pointed out by Baldwin (2) the size of these coefficients is increased by the wide range of ages. It is

possible to gain some knowledge of the influence of the age factor by the method of partial correlation. The results for 49 girls selected because of the completeness of the data, show the following intercorrelations of height, weight, X-Rays, mental and chronological age.

TABLE XV INTERCORRELATIONS BETWEEN PHYSICAL TRAITS, CHRONOLOGICAL AND MENTAL AGE				
	Chr. Age	Weight	Height	Mental Age
Age				
Weight	.84			
Height	.88	.86		
Mental Age	.88	.71	.89	
X-Ray	.92	.88	.92	.83

The partial correlations with one factor constant for these same girls are given in Table XVI.

TABLE XVI PARTIAL CORRELATIONS BETWEEN PHYSICAL TRAITS, CHRONOLOGICAL AND MENTAL AGE					
Traits	Constants				
	Chron. Age	Mental Age	Height	Weight	X-Ray
Height-Weight	.57	.80			.38
Height-Chr. Age		.41		.52	.16
Height-Ment. Age	.53			.81	.59
Height-X-Ray	.62	.73		.65	
Weight-Chr. Age		.66	.30		.14
Weight-Ment. Age	— .15		— .40		— .11
Weight-X-Ray	.52	.76	.37		
X-Ray-Chr. Age		.72	.62	.71	
X-Ray-Ment. Age	.09		.04	.63	
Chr.-Ment. Age			.47	.76	.54

The influence of chronological age is more important with some traits than others. For example the correlations between physical traits are very little influenced by keeping chronological age constant (+.89 to +.53). Although there is no correlation between weight or X-Rays and mental age for this group when chronological age is kept constant, there is a positive correlation between height and mental age.

SUMMARY AND CONCLUSIONS

1. There is a similarity in the mental growth curves of brothers and sisters. The resemblance between brothers and sisters is further shown in physical traits by the correlation of the height X-Ray and weight quotients and in mental traits by the correlation between the I. Q.'s. The correlations are higher for the physical traits than for the mental.

2. The mean mental age of physiologically accelerated is higher than the mean mental age of physiologically retarded children. This study is the first to determine for the same individuals the relation between general physical status and mental growth as determined by consecutive intelligence examinations.

3. The coefficients of correlation between height and mental age are high even when the influence of chronological age is eliminated.

IV. GENERAL CONCLUSIONS

For years the literature has been full of statements in regard to the desirability of obtaining repeated measurements on the same children in order to study the process of mental development. The use of the Stanford Revision of the Binet scale even for the relatively short period of four years shows the unsuitability of this scale in its present form as a means for measuring mental growth. The limited number of alternative tests results in a certain practice effect on repeated examinations. Another defect of the present system of tests is the lack of a sufficient number of tests at the higher levels to measure the mental growth that apparently goes on in a bright young child even after the exhaustion of the 16 or 18 year old tests. It is commonplace in clinical psychology that a gifted child has more opportunity to gain a high I. Q. if measured early in his life where he has a greater range of tests in which to succeed. Theoretically it would seem to be a better measure of mental growth to use a combination of point scales for specific mental traits, each scale to be sufficiently extended to measure whatever ability exists and the whole system to include a sufficient variety of traits to afford a general measure of the development of the individual.

The findings of this study have been summarized in detail at the end of each section. A survey of these results show the importance of many factors influencing mental growth processes,

and producing differences in the mental growth curves of boys and girls, and of children of superior and average ability.

An analysis of the individual growth curves shows that the I. Q. is only approximately constant during successive examinations. The amount of difference between I. Q.'s obtained at various examinations is sufficiently small, and the correlations between the examinations are sufficiently high with small probable errors of estimate, to permit of predicting from an earlier examination what the individual's later development will be.

The most significant outcome of this study is the empirical determination of the mental growth curve and the establishment of the close interrelation between mental and physical development as shown by the general similarity between growth in height and in mental age, the rise in the mental age curve at the adolescent years, the superior mental development of physiologically accelerated children, and the high correlation between mental age and height.

It is evident that **mental age** ratings by the present scale are the result not only of native intelligence but also of the degree of physiological acceleration over that which is normal for the age. This latter factor is of **extreme** importance in any educational or social treatment of the individual. A high I. Q. reflects this factor as well as the general intelligence that it is designed to measure.

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ADDITIONAL DATA FROM CONSECUTIVE STANFORD-BINET TESTS

Supplement to Iowa Studies in Child Welfare, Vol. II, No. 1

ADDITIONAL DATA FROM CONSECUTIVE STANFORD-BINET TESTS¹

BIRD T. BALDWIN
AND
LORLE I. STECHER

This article presents supplementary data as a result of further tests by the Stanford Revision of the Binet Scale of 143 cases reported by the writers in January, 1922². Just one year later 32

TABLE I.—COEFFICIENTS OF CORRELATION FOR IQ'S. BOYS AND GIRLS

Examination number	1	2	3	4	5
2	+ .850 ± .031				
3	+ .738 ± .051	+ .846 ± .031			
4	+ .779 ± .044	+ .802 ± .040	+ .910 ± .019		
5	+ .817 ± .037	+ .815 ± .037	+ .839 ± .033	+ .918 ± .017	
6	+ .812 ± .038	+ .751 ± .049	+ .796 ± .041	+ .866 ± .028	+ .944 ± .012

of the 36 cases who had received five previous examinations had a sixth; 40 of the 42 cases who had had four previous examinations had a fifth; 41 of the 51 cases who had had three previous examinations had received a fourth; 31 of the 56 cases who had had two examinations had received a third; 64 additional cases with two examinations were included.

These new data confirm the findings of the previous study that for practical purposes the IQ remains sufficiently constant for a group as a whole, but that the individual records show fluctuations

¹ Reprint from the *Journal of Educational Psychology*, 1922, (13), 556-560.

² Baldwin, B. T. and Stecher, L. I.: The Mental Growth Curve of Normal and Superior Children Studied by Means of Consecutive Intelligence Examinations. *Univ. of Iowa Studies in Child Welfare*, 1922 (2), No. 1, pp. 61.

which are smoothed out in obtaining general averages. The amount of these fluctuations is evident in the tables of original data in the previous study, pp. 24-29, which have been brought up to date in mimeographed form and may be had on application to the writers.

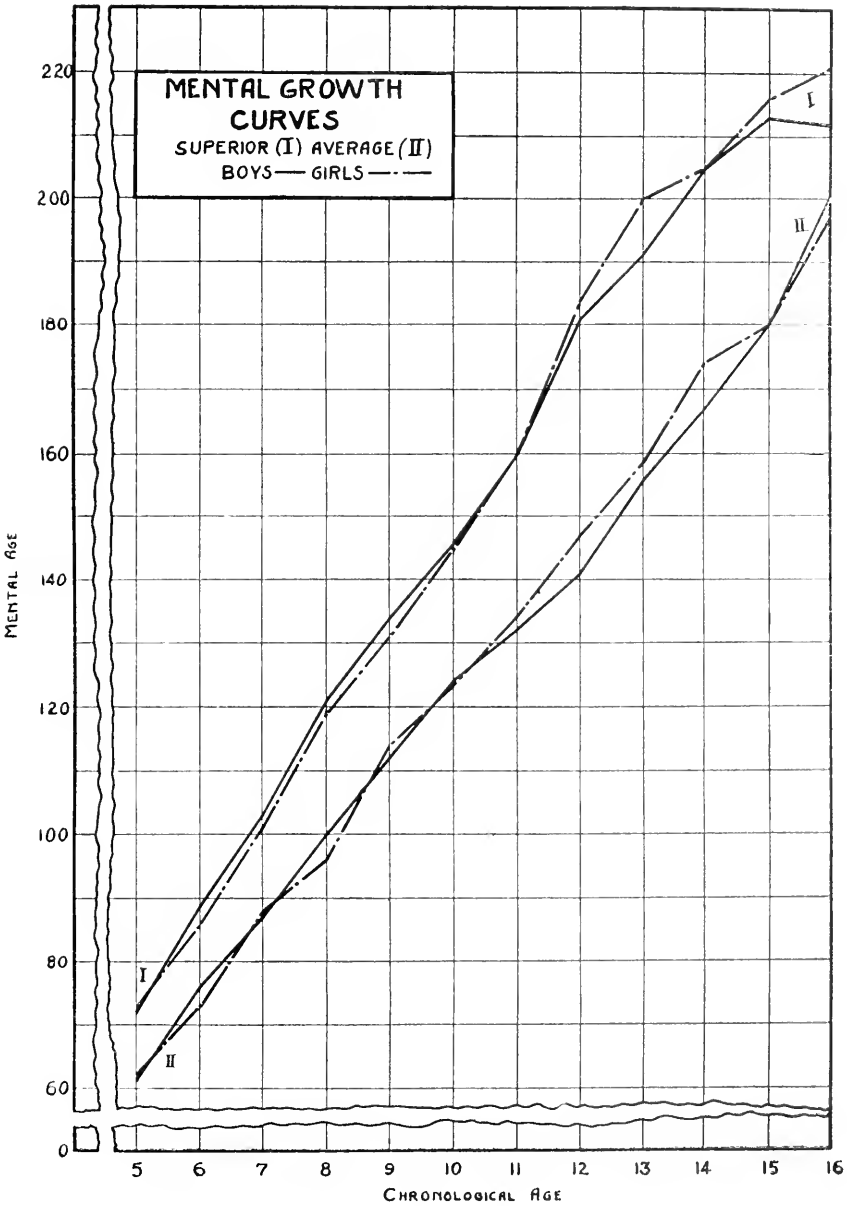
The inter-correlations with examinations, for those who have IQ's, (given in Table I) show the distribution of the individuals within this group on subsequent tests. The correlation between the fifth and sixth examination is the highest ($+0.944$), which probably means that the individuals have become thoroughly stabilized within the group.

The writers have previously analyzed the sort of growth curve that results from the repeated application of the Stanford Revision. This curve represents one aspect of mental growth when measured by an existing tentative scale. Additional data permit the calculation (by the same method previously used) of the figures of Table II, the mean mental age in months for each sex at each age of children of superior and of average mental ability.

Chart 1 shows these data in graphic form. The curves have in general the same appearance as those in the previous study with

TABLE II.—MEAN MENTAL AGE IN MONTHS OF SUPERIOR AND AVERAGE BOYS AND GIRLS FOR SUCCESSIVE CHRONOLOGICAL AGES (BASED ON CONSECUTIVE EXAMINATIONS)

Chronological age	Boys		Girls	
	IQ 110+ (superior)	IQ 90-110 (average)	IQ 110+ (superior)	IQ 90-110 (average)
5	72	61	73	62
6	89	76	86	73
7	103	87	101	88
8	121	100	119	96
9	134	112	131	114
10	146	124	145	123
11	160	132	160	134
12	181	141	184	147
13	191	156	200	159
14	205	167	205	174
15	213	180	216	180
16	212	201	221	198



the exception of the curve for the average girl which lies much closer to the average boy's curve than formerly, probably due to the addition of more average girls at this age: The average curves are approximately straight lines, which show that these children are comparable to those on whom the scale was standardized. In contrast with the straight-line average curves, the superior curves show fluctuations at the adolescent ages, indicative of the earlier mental development of superior children. Both the superior and the average girls of this group are in advance of the boys at the adolescent ages—12 to 14—when measured by this scale.¹ As previously pointed out, this adolescent spurt is analogous to the adolescent acceleration so frequently found in physical growth curves in height, weight, breathing capacity and other physical traits.

Unfortunately we have not, in the present state of development of the science, any measuring instrument that at all approximates the apparatus for measuring physical growth. The cheapest measuring stick is superior, both in equality of units and in extent, to our mental measurement scales. These poor mental tape lines wrinkle and stretch in places, and someone has cut off a little from both ends! The unit of measurement in mental growth scales is not an absolute unit such as the centimeter or the kilogram. The writers are in hearty agreement with the author² of a somewhat facetious review in regard to the desirability of discovering such

¹ This conclusion has recently received some support from the evidence of Sullivan and Murdock (*Journal of Educational Psychology*, 1922, Vol. 13, 350-362).

² Sandiford, P.: *Journal of Educational Psychology*, 1922 (13) 378-379. The joint authors of this study, which the reviewer attributes mainly to one of them, take this opportunity to correct a few misapprehensions. (1) In view of the discussion above, there can be no objection to the plotting of mental age curves in regard to which the reviewer seems to have such a serious complex. (2) The reviewer comments on the fact that the authors believe the curves to be straight. That this is not the case is shown by the quotation (p. 12), "further analysis reveals, however, a very significant change in the trend with the approach of adolescence. This is especially marked in the curve for girls, etc." (3) The mental age curves and the IQ curves are, indeed, as the reviewer has aptly put it, "the same thing plotted in a different fashion." Although both are approximately straight lines, "there are fluctuations associated with physical development" (in the IQ curve) and "there is a significant change in the trend with the approach of adolescence" (in the mental age curve)—surely not, as the reviewer states, "diametrically opposite conclusions." (4) The authors presume that the reviewer failed to find one or two real errors which they now desire to point out. On page 12, beginning with line 25, one should read, "At 6 years — 1 month, + 11 months at the rate of 1.38 or 104 + (11 × 1.38) or 119.18." Other proof-reading errors will be found on pages 12 and 17.

an absolute unit of mental growth. An inch of growth in height is the same between 5 and 6 years or between 12 and 13 years. There is good reason to believe, however, that 2 months mental growth may mean a very different thing at these two periods. The amount of mental growth for 2 mental months at the earlier age may be only half that of 2 mental months at the later age. We do not know. We assume that the difficulty of the tests within the scale takes this into consideration and meets the differences fairly accurately. By the very fact of such construction, however, mental age scales tend to conceal any differences in the rate of mental growth that may exist. If any adolescent acceleration appears, it is all the more significant. Even the discovery of this hypothetical absolute unit of mental growth will not provide a scale for measuring mental growth, because mental growth like physical growth is a complex process involving development in a diversity of traits and functions. For example, physical growth is measured in inches, pounds, square inches, cubic inches, and a large number of other units for strength, temperature and metabolism measurements. It is possible to get some idea of the individual's development from a measurement of the height or the weight alone, but a complete growth curve is the result of composite measurements. That the writers have already pointed out this fact in the earlier study is shown by the following quotation (page 58), "Theoretically it would seem to be a better measure of mental growth to use a combination of point scales for specific mental traits, each scale to be sufficiently extended to measure whatever ability exists and the whole system to include a sufficient variety of traits to afford a general measure of the development of the individual."

UNIVERSITY OF IOWA
STUDIES

STUDIES IN CHILD WELFARE

VOLUME II

NUMBER 2

DIFFERENTIAL FECUNDITY IN IOWA

BY

HORNELL NORRIS HART

PUBLISHED BY THE UNIVERSITY, IOWA CITY

Issued semi-monthly throughout the year. Entered at the post office at Iowa City, Iowa, as second class matter. Acceptance for mailing at special rates of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

UNIVERSITY OF IOWA STUDIES IN CHILD WELFARE

PROFESSOR BIRD T. BALDWIN, PH. D., EDITOR

FROM THE IOWA CHILD WELFARE RESEARCH STATION

VOLUME II

NUMBER 2

DIFFERENTIAL FECUNDITY IN IOWA A STUDY IN PARTIAL CORRELATION

BY

HORNELL NORRIS HART, PH. D.

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FOREWORD

The fundamental aim of the Child Welfare Research Station is to help the State to conserve and to develop every child to the maximum ability consistent with its native endowment and special aptitudes. In order to do this it is necessary that a series of searching investigations be made from time to time into the various aspects of child life in Iowa.

The problem of child welfare in Iowa is intimately bound up with the number and quality of children born into our Iowa homes. These two factors condition in a large measure the practical methods of child rearing.

This second study by Dr. Hart throws definite light on the general questions: What types of individuals in our State are becoming parents? Are more children born, proportionately, in the city than in the country? Are the larger families found among the native born, among the home owners, among those of average or superior school training? The answers to these questions have direct and significant bearings on the future citizenship of our State.

BIRD T. BALDWIN.

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Iowa Child Welfare Research Station,
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DIFFERENTIAL FECUNDITY IN IOWA

I. THE PROBLEM STATED

The problem of the declining birth rate is particularly acute in Iowa. As is pointed out in the writer's study of Selective Migration (9, p. 122), the number of children per 1,000 women of child-bearing age had decreased in 1915 to less than 40 per cent of what it was in 1840. While this decline in fecundity* is more spectacular than differential fecundity at the present date, the latter is of far greater consequence from a sociological point of view.

The rural districts in Iowa have been much more fecund than the cities, and the foreign-born have had more children than the native-born, but no searching study of differential fecundity in Iowa has been made. (9, p. 123). The present inquiry seeks information primarily as to what types of persons in the Iowa population are reproducing most rapidly, and as to the extent of the differences in their fecundity.

II. TECHNIQUE

It is proposed to attack the problem by means of linear partial regression equations predicting in terms of other correlated indices fecundity rates in the 99 counties of Iowa.

1. *Derivation of Indices.* The latest, and by far the most complete, statistics relating to the characteristics of the populations of the counties of Iowa are contained in the 1915 State Census. (13). On the basis of these data indices have been derived with a view to testing, as far as possible, the current hypothesis relative to differential fecundity, such as that rural populations are more fecund than urban, foreign-born more fecund than native-born, the poor and ignorant more fecund than the well-to-do and the well educated, and Catholics more fecund than Protestants. The following indices were derived, and were designated by the letters indicated.

A is the fecundity index, consisting in the number of children under five years of age per 1,000 women 21 to 44 years of age (13, pp. 418ff.). The age span employed differs from that used by Wilcox (37) because of the method of age classification employed by the state census. This fecundity index is more desirable for

*By the term "fecundity" as used in this study is meant not the physiological power of procreation but the characteristic of actually producing offspring.

the study in hand than birth-rates would have been, even had accurate birth-rates been available, because the number of children under five years of age already has had deducted from it most of the deaths of early infancy, and hence this index represents more nearly net fecundity than would birth rates. Being based on the number of women of child-bearing age, this index is far more useful than any rate per 1,000 of population, for the variations in the proportion of women of child-bearing age in the population introduce serious errors into calculations where crude birth-rates are employed.

D is the percentage of the population living in cities and towns (State Census 13, pp. 606-7). This is not the percentage of urban population as defined by the United States Census, for the Iowa data include all incorporated places as urban, while the Federal Census excludes places under 2,500.

G is an index of the age distribution of women. It consists in the number of women 19 to 20 years of age per 1,000 women 45 years of age and over. This index, as illustrated in Chart I on page 20, is $\frac{1000 \cdot e}{f}$ (13, pp. 418-33). The reason for choosing these age groups is that the age groupings reported by the State Census are as follows: zero to four years, five to nine, 10 to 17, 18 to 20, 21 to 44, and 45 and over. The two groups selected are those lying next above and below the age of child-bearing (21 to 44).

I is the number married per 1,000 females 21 to 44 (13, pp. 491ff.).

J is the number per 1,000 males 10 to 17 years of age attending school nine months or over in 1914 (13, pp. 418ff., 512ff.).

L is the number, per 1,000 persons over school age, who were reported as having attended school eight years or more (13, pp. 523ff.).

M is the number owning homes per 1,000 persons 21 to 44 years of age (13, pp. 418ff., 618ff.).

N is the number of persons reported as members of Catholic churches per 1,000 of population (13, pp. 418ff., 705ff.).

O is the number of non-Catholic church members reported per 1,000 of population (13, pp. 418ff., 705ff.).

P is the number of foreign-born persons per 1,000 of population (13, p. XLIX).

Q is the number of persons attending high school in 1914 per 1,000 persons 10 to 17 years of age in 1915 (13, pp. 418ff., 518ff.).

These indices, for the 99 counties of Iowa, are shown in Table 1.

TABLE 1

INDICES OF FECUNDITY AND OF CERTAIN MORE OR LESS CORRELATED SOCIAL CONDITIONS IN IOWA COUNTIES IN 1915
Source of Data (13) pp. xlix, 418ff., 491ff., 518f., 523ff., 606f., 618ff., 705ff.

County	A	D	G	I	J	L	M	N	O	P	Q
	Children under 5 years per 1,000 females 21-44	Per cent of population incorporated in places	Women 18-20 years and over per 1,000 45	Married women 21-44 per 1,000	Males 10-17 attending school 9 months per 1,000 males 10-17	Persons over school age reported as having attended 8 years or more	Persons 21-44 owning homes 21-44 per 1,000	Catholic church members per 1,000	Non-Catholic church members per 1,000	Foreign-born population per 1,000	Persons attending high school per 1,000 persons 10-17
Arithmetic Mean	612	46	286	746	467	703	143	80	253	106	164
Standard Deviation	81	14	51	41	117	76	24	79	75	50	44
Adair	663	33	281	787	380	744	143	56	257	60	107
Adams	610	27	263	776	298	806	170	24	226	40	131
Allamakee	630	34	250	656	301	646	181	295	203	118	109
Appanoose	720	54	299	822	428	581	158	0	230	106	126
Audubon	740	29	346	768	278	631	166	33	207	196	86
Benton	610	48	253	767	497	778	144	73	240	93	168
Black Hawk	468	78	282	707	675	697	129	119	307	112	199
Boone	580	55	290	670	476	691	136	4	179	117	150
Brener	617	45	264	792	441	652	197	46	445	120	150
Buchanan	593	42	241	740	533	810	144	168	204	75	149
Buena Vista	578	44	296	728	543	688	129	32	359	173	172
Butler	682	36	270	766	411	770	147	43	202	149	145
Calhoun	618	45	318	755	431	741	131	55	354	100	209
Carroll	654	48	322	704	587	594	126	322	153	128	131
Cass	586	49	259	732	521	658	156	61	296	86	195
Cedar	570	37	240	757	475	848	149	11	242	116	185
Cerro Gordo	561	70	331	748	551	736	113	92	241	166	178
Cherokee	578	47	310	721	483	703	108	101	200	138	151

TABLE 1 Continued

County	A	D	G	I	J	L	M	N	O	P	Q
Chickasaw	637	38	286	726	483	745	169	274	209	100	130
Clarke	607	27	260	760	307	768	177	23	306	19	203
Clay	623	42	322	746	440	771	134	0	215	123	188
Clayton	617	39	272	722	381	647	191	147	176	102	121
Clinton	492	70	272	667	633	703	126	63	162	168	101
Crawford	643	42	341	740	539	733	139	81	221	175	99
Dallas	611	49	252	778	509	718	140	47	284	65	189
Davis	638	25	232	809	191	796	183	0	212	18	89
Decatur	713	42	360	776	310	675	162	9	423	19	142
Delaware	683	37	242	729	501	661	154	132	206	87	159
Des Moines	410	75	229	657	600	613	104	104	263	124	150
Dickinson	654	46	364	780	435	741	143	75	162	90	149
Dubuque	501	79	312	584	581	670	88	421	112	126	123
Emmet	703	50	370	795	482	736	149	31	292	138	111
Fayette	622	50	268	760	521	685	147	117	210	105	123
Floyd	518	55	255	741	505	695	138	51	241	108	157
Franklin	651	36	321	812	261	718	142	13	248	153	94
Fremont	692	40	282	769	715	626	132	49	294	30	167
Greene	687	41	288	651	361	773	125	81	240	60	138
Grundy	727	35	329	764	356	785	109	23	252	167	137
Guthrie	651	39	265	785	316	799	156	74	248	46	143
Hamilton	656	46	290	737	353	641	133	33	269	139	100
Hancock	698	34	341	777	312	661	154	69	291	154	137
Hardin	567	52	250	743	533	747	125	34	332	118	181
Harrison	660	44	314	785	553	623	148	236	75	70	152
Henry	503	45	200	714	476	748	143	25	387	50	170
Howard	633	32	301	730	440	642	163	308	196	118	130

TABLE 1 Continued

County	A	D	G	I	J	L	M	N	O	P	Q
Humboldt	657	44	314	766	473	682	131	41	271	160	212
Ida	626	40	356	746	505	703	121	47	177	173	187
Iowa	631	30	285	753	393	828	152	107	325	107	160
Jackson	554	43	243	700	399	652	171	26	404	100	134
Jasper	615	44	250	786	559	695	139	24	310	90	159
Jefferson	555	48	243	737	388	822	142	60	290	48	196
Johnson	508	53	270	673	616	834	158	151	166	92	254
Jones	598	42	254	773	427	753	150	97	226	105	182
Keokuk	586	42	240	766	440	769	189	82	320	44	183
Kossuth	776	35	398	787	405	671	161	155	167	139	133
Lee	451	70	218	675	491	768	106	177	207	66	187
Linn	446	75	264	715	688	718	129	69	254	131	215
Louisa	652	46	233	771	520	692	153	0	284	34	229
Lucas	663	46	224	787	359	790	162	26	238	56	147
Lyon	812	38	422	750	383	643	120	35	156	216	122
Madison	621	33	218	785	285	810	185	16	340	27	144
Mahaska	536	48	253	741	455	648	127	20	250	75	199
Marion	615	43	235	780	431	655	141	13	358	92	117
Marshall	525	62	234	737	600	698	129	49	269	89	217
Mills	600	47	321	720	582	640	141	3	204	48	159
Mitchell	581	46	260	702	364	669	159	131	321	122	236
Monona	722	24	325	800	477	649	134	30	213	101	163
Monroe	737	24	330	808	310	419	118	58	153	125	90
Montgomery	566	55	245	749	527	746	136	12	315	109	233
Muscatine	489	69	239	727	607	740	114	59	276	105	154
O'Brien	639	49	362	737	602	814	124	38	266	164	186
Osceola	748	36	405	745	348	668	110	80	233	161	114
Page	576	55	254	750	624	585	125	12	339	61	180

TABLE 1 Continued

County	A	D	G	I	J	L	M	N	O	P	Q
Palo Alto	726	40	342	750	388	741	132	210	175	129	119
Plymouth	671	41	378	714	547	702	107	197	160	153	150
Pocahontas	700	34	348	746	468	688	148	218	216	126	203
Polk	436	87	320	702	750	676	118	92	272	109	232
Pottawattamie	532	68	310	752	641	657	123	73	179	123	158
Poweshiek	562	47	253	758	528	738	153	30	301	74	285
Ringgold	671	33	257	857	331	787	193	44	369	22	169
Sac	644	43	301	758	432	700	120	49	241	119	192
Scott	417	81	259	696	715	765	100	30	109	171	147
Shelby	711	34	326	749	453	571	132	219	278	169	146
Sioux	781	40	407	741	623	605	113	111	295	256	135
Story	570	58	272	716	488	699	126	41	359	107	253
Tama	600	43	259	779	392	702	152	88	212	133	176
Taylor	578	39	235	783	404	693	172	21	343	23	169
Union	508	59	209	749	507	732	133	71	289	56	189
Van Buren	568	36	179	777	323	788	206	5	261	19	199
Wapello	510	70	265	746	572	634	135	37	230	66	189
Warren	603	36	239	749	441	817	168	85	357	24	317
Washington	567	43	223	755	576	791	157	78	378	44	275
Wayne	579	45	245	787	368	760	175	0	339	23	185
Webster	600	63	377	723	545	660	134	117	218	156	133
Winnebago	709	42	360	708	374	644	159	33	315	182	138
Winneshiek	608	32	262	657	306	620	174	195	266	145	99
Woodbury	479	83	390	700	708	530	85	80	164	178	211
Worth	647	33	312	736	230	492	145	22	320	159	127
Wright	647	53	318	761	500	793	121	57	246	135	201

2. *Calculation of Zero Order Correlations.* All of the linear correlations in this study were calculated without grouping of items. The method first used was to assume 0 as the average for each index, thus avoiding the use of negative deviations and products. In practice, however, this method proved to require great labor because of the large size of the squares and products involved. In order to utilize the zero order correlations for the calculation of partials of higher orders great accuracy is essential. This has been insured by calculating all of the zero order correlations twice, using two different assumed averages, and requiring that the results check within .00005. All correlations were carried out to five places. It was recognized, of course, that the probable errors of the coefficients, due to random sampling, were so large as to make five place r's ridiculous for the purposes of interpretation; this degree of accuracy is required merely because of algebraic reasons. Correlations are given in this text to only two places.

3. *Calculation of Partial Correlations.* To carry the calculation of seventh order partial correlations to the degree of accuracy required would prove an immense task if all the values of $\sqrt{1-r^2}$ had to be calculated by ordinary methods. To obviate this difficulty the author has devised a compact chart from which the required values may be read off directly within an error of .00005. Seventh order partials were derived by these methods with maximum errors of .0001. Most of the calculations were performed, under the writer's direction, by Mr. James Sarkisian and Mr. Arnold Wilbur.

Professor H. L. Rietz, who has been kind enough to read and criticize this paper, raises the question whether the formula for the probable errors of partial correlations is valid when used with only 99 cases. It is obvious, of course, that if the number of items considered were only as large as the number of variables involved (e. g. two items for zero order correlations, three items for first order, four for second order, and so on) perfect positive or negative correlations would always result, no matter what the true relationship between the variables. In such a case, obviously, the usual formula for probable error would be highly erroneous. This same type of error will be present in diminished degree unless a considerable number of items is involved. In defense of the use of partials in this study it may be urged, first that the seventh order partials show no signs of approaching ± 1.0 ; that the partials

appear to act consistently when new variables are added, as will be seen from a study of the tables which follow in the text; that the final conclusions are based chiefly on correlations of less than the fourth order; and that the results as a whole are self-consistent, and consistent with the results of other studies.

In passing it may be well to refer to the methods developed by Truman Kelly for calculating partials (15, 16). His original tables are, as he himself recognizes (15, pp. 5 and 6), not carried out for enough places to be of use in calculating partials beyond the first or second order. His more recent chart does not permit of sufficient accuracy for the purposes of the present study. His method of successive approximation was not attempted. Where it is important to be able to study the effect upon the original correlation of assigning one factor after another it is a great advantage to have the series worked out step by step. It is not necessary, of course, to calculate the partial correlations of all of the possible combinations of the indices.

The first series of partials calculated involved only the indices A, D, I, J, L, M, N, O, and P. When the results were analyzed, certain conditions appeared to suggest the presence of an uncontrolled age variable, and index G was developed. The failure to establish any important correlations between A and J when D was constant seemed so surprising that index Q was developed. A study of the data made it seem unnecessary to go farther than the fourth order with partials involving G and Q.

4. *Fecundity Regressions.* For several purposes regression coefficients are more useful than correlation coefficients. The regressions required have been calculated by the methods outlined by Yule (41, p. 240). In calculating the probable errors of regression coefficients the writer has expressed the formula given by Yule (41, p. 253), in the more convenient form:

$$P.E.b_{12.K} = \frac{.6745}{\sqrt{n}} \frac{b_{12.K} \sqrt{1-r_{12.K}^2}}{r_{12.K}}$$

Where K represents any collection of secondary subscripts other than 1 or 2.

The advantage of this formula over the one given by Yule is that the latter involves the quantity $\sigma_{2.K}$, which must ordinarily be

specially calculated for this use, whereas the substitute formula involves only quantities which have already been calculated.

In interpreting correlations in this study, interest centers about differences, not between county and county, but between various types of people. Counties are used simply as convenient units for investigation. It happens that certain very significant factors, such as home ownership, vary but little from county to county. Correlations of fecundity with these indices, by counties, therefore are low. At the well-recognized risk of misinterpreting trends beyond the range of observation, the predictions of fecundity in counties where these indices would reach their theoretical extremes have been calculated, with a view to predicting for comparison the fecundity of a population wholly of a given type with the fecundity of a population wholly of the opposite type.

III. INTERPRETATION OF FECUNDITY CORRELATIONS AND REGRESSIONS

5. *Rural-Urban Distribution and Fecundity.* The highest correlations which occur in the entire series are those between fecundity and percentage of urban population. The partial correlations derived between A and D with various other factors assigned, are shown in Table 2.

TABLE 2					
AD CORRELATIONS					
r_{AD}	$-.74 \pm .03$	$r_{AD.IJLNOP}$	$-.73 \pm .03$	$r_{AD.LMNOP}$	$-.77 \pm .03$
$r_{AD.G}$	$-.84 \pm .02$	$r_{AD.IJLMNOP}$	$-.72 \pm .03$	$r_{AD.LMNOP}$	$-.77 \pm .03$
$r_{AD.GI}$	$-.79 \pm .03$	$r_{AD.IMNOP}$	$-.71 \pm .03$	$r_{AD.LMOP}$	$-.77 \pm .03$
$r_{AD.GIM}$	$-.73 \pm .03$	$r_{AD.IPQ}$	$-.70 \pm .03$	$r_{AD.LNOP}$	$-.81 \pm .02$
$r_{AD.GIP}$	$-.79 \pm .03$	$r_{AD.J}$	$-.62 \pm .04$	$r_{AD.MN}$	$-.77 \pm .03$
$r_{AD.GIQ}$	$-.77 \pm .03$	$r_{AD.JLMN}$	$-.67 \pm .04$	$r_{AD.MNOP}$	$-.77 \pm .03$
$r_{AD.GM}$	$-.76 \pm .03$	$r_{AD.JLMNO}$	$-.67 \pm .04$	$r_{AD.MOP}$	$-.77 \pm .03$
$r_{AD.I}$	$-.67 \pm .04$	$r_{AD.JLMNOP}$	$-.69 \pm .04$	$r_{AD.NOP}$	$-.81 \pm .02$
$r_{AD.IJLMNO}$	$-.60 \pm .04$	$r_{AD.JLMNP}$	$-.67 \pm .04$	$r_{AD.O}$	$-.76 \pm .03$
$r_{AD.IJLMNOP}$	$-.62 \pm .04$	$r_{AD.JLMOP}$	$-.69 \pm .04$	$r_{AD.OP}$	$-.80 \pm .02$
$r_{AD.IJLMNP}$	$-.59 \pm .04$	$r_{AD.JLNOP}$	$-.69 \pm .04$	$r_{AD.P}$	$-.80 \pm .02$
$r_{AD.IJLMOP}$	$-.64 \pm .04$	$r_{AD.JMNOP}$	$-.68 \pm .04$	$r_{AD.FQ}$	$-.77 \pm .03$
$r_{AD.IJLNOP}$	$-.60 \pm .04$	$r_{AD.LMN}$	$-.78 \pm .03$	$r_{AD.Q}$	$-.72 \pm .03$

$r_{AD.G} = -.84 \pm .02^*$; i. e. the correlation between fecundity and

*In interpreting this and other probable errors in this table and the following tables, the fact that only 99 items are involved should be borne in mind. The probable errors for the higher order partials are not very reliable.

percentage of urban population when the age index is assigned is as likely as not to be between $-.82$ and $-.86$, while the chances are 1,000 to 1 that the true correlation lies between $-.76$ and $-.92$.

This correlation is due in part to the negative correlation between percentage of population living in cities and percentage of women married: $r_{DI} = -.48 \pm .05$.

Certain of the other variables account to a small extent for the correlation, but the lowest value reached is $-.59 \pm .05$, so that a clearly established negative correlation exists between fecundity and the percentage of urban population, even when the other indices listed are assigned.

In general, three types of explanation must be considered for a correlation r_{XY} . First, the presence or size of X may result from the presence or size of Y ; second, the presence or size of Y may result from the presence or size of X ; third, both X and Y may result from some common cause or group of causes. In the case of r_{AD} , it might theoretically be true that families move to the country, or stay in the country, because they have babies, that families in the country tend to have more babies than families in the city because rural conditions are more favorable to fecundity than urban conditions are, or that some common element, such as contentment with a vegetative, domestic life, favors both remaining in the country and rearing children. Of these three possibilities, the first seems least likely, and the second most likely, though final decision must wait upon further inquiry.

In any case it seems safe to conclude that women in cities have fewer children than women in rural districts in Iowa, apart from differences correlated with age distribution, nativity, religion, education and home ownership. The amount of this difference in fecundity is suggested by the regression equation for predicting A from D , which is:

$$A'_D = 612 \pm 5 - (4.4 \pm .3)(L - 46 \pm 1) \pm 37.*$$

If the percentage of urban population were zero, the fecundity rate, according to this equation, would be 814 ± 51 ; if the percentage of urban population were 100, the fecundity would be 374 ± 41 . The difference between these two rates, or -440 ± 65 , represents the maximum change in A which would correspond with a change

*In this and subsequent regression equations the probable errors of the averages and regression coefficients are stated after the respective numbers, with a \pm sign. The last number in each regression equation is the probable error of estimate.

of the whole possible range of D. As a check on this reasoning it should be noted that the fecundity rates as estimated from data dealt with in the writer's study of migration (9, p. 124) are 416 for purely rural territory, and 755 for urban territory. The difference between these two latter rates is —339, instead of —440 as estimated by regressions. The difference between the two estimates (which is less than twice the probable error of the regression prediction) is doubtless due, as will be shown later, to the existence of a curvilinear instead of rectilinear relationship between fecundity and rural-urban distribution.

6. *Fecundity and the Age Index G.* The relationship between A and G is shown in Table 3.

TABLE 3										
DISTRIBUTION OF IOWA COUNTIES ACCORDING TO FECUNDITY (A) AND AGE INDEX (G)										
Derived from Table 1.										
Age Index	Fecundity									Total
	400-449	450-499	500-549	550-599	600-649	650-699	700-749	750-799	800-849	
150-199	0	0	0	1	0	0	0	0	0	1
200-249	1	2	4	9	4	3	0	0	0	23
250-299	2	2	3	9	13	7	2	0	0	38
300-349	1	0	2	2	8	5	7	0	0	26
350-399	0	1	0	0	3	2	2	1	0	9
400-499	0	0	0	0	0	0	1	1	1	3
Total	4	5	9	21	28	17	12	2	1	99

Apart from the AD correlations the highest correlation with A found in the study is $r_{AG,DI} = +.75 \pm .03$. The AG correlations are shown in Table 4.

TABLE 4					
AG CORRELATIONS					
r_{AG}	$+.53 \pm .05$	$r_{AG,DIP}$	$+.62 \pm .04$	$r_{AG,L}$	$+.51 \pm .05$
$r_{AG,D}$	$+.73 \pm .03$	$r_{AG,DIQ}$	$+.73 \pm .03$	$r_{AG,M}$	$+.69 \pm .04$
$r_{AG,DI}$	$+.75 \pm .03$	$r_{AG,DM}$	$+.68 \pm .04$	$r_{AG,N}$	$+.54 \pm .05$
$r_{AG,DIJ}$	$+.75 \pm .06$	$r_{AG,I}$	$+.61 \pm .04$	$r_{AG,O}$	$+.54 \pm .05$
$r_{AG,DIL}$	$+.72 \pm .03$	$r_{AG,IP}$	$+.51 \pm .05$	$r_{AG,P}$	$+.55 \pm .05$
$r_{AG,DIM}$	$+.69 \pm .04$	$r_{AG,J}$	$+.66 \pm .06$	$r_{AG,Q}$	$+.47 \pm .05$

The lowest value in this series is $r_{AG,Q} = +.47 \pm .05$. It seems safe to conclude, therefore, that the age distribution of the women, when other factors noted are assigned, has a high, clearly estab-

lished, positive correlation with fecundity. The interpretation of correlations involving G is not, however, as simple as it at first seems. The correlation $r_{AG} = +.53 \pm .05$ might mean that the type of age distribution where G is high results in a high net birth rate per 1,000 women of child-bearing age, or it might mean that a high fecundity tends to produce the type of age distribution where G is large, or it might mean that certain factors favorable to the type of age distribution where G is high are also favorable to high fecundity.

With regard to the first of these possibilities, it has been recognized by other investigators that fecundity varies sharply with age. Whipple (36) quotes data from Budapest as indicating that fecundity for females reaches its maximum between the 18th and 19th years, falling steadily to the age 50, when it practically ceases. Perhaps the best American data on births in relation to the age of the mothers are contained in the studies of Infant Mortality made in certain cities by the United States Children's Bureau (32). The United States Census gives the numbers of married women by broad age groups in these cities in 1910 (29). From these data rough estimates have been made as to the relative birth rates at various ages, for Brockton, Mass., Johnstown, Pa., Manchester, N. H., and Waterbury, Conn. Young (38) also presents data for New Hampshire. Better data are available for other countries. Webb's Dictionary of Statistics gives the mean annual number of births or accouchements per 1,000 wives by five year age groups, for Denmark, Sweden, Finland, Austria, France, New South Wales, Victoria and Western Australia, for various dates from 1871 to 1903 (34).

All of the above data support the conclusions noted by Whipple, that fecundity declines steadily from the teens until it disappears at about the age of 50. The present study has been concerned with the number of children, not per 1,000 married women, but per 1,000 women of child-bearing age. Careful computations indicate that the above difference in birth rates would probably result in a difference in the fecundity indices between the women 25-29 years of age and the group 40-44 of 350 to 500 points, depending upon which birth rates are assumed. Hence it will be seen that if the women 21 to 44 years of age were concentrated at the upper end of this age period their fecundity would be expected, other things being normal, to be approximately 240 points lower than

the average, whereas if the women were concentrated at the ages of 25 to 29 the expected fecundity would be about 160 above the average.

In order more accurately to judge the significance of differences in average age as reflected in the G index, the value of G for each state in the United States in 1910 was calculated from United States Census data, (29, pp. 361ff., 548ff.) and for the 32 states in which G fell within the range of that variable in Iowa counties in 1915 (which was 179 to 422) the weighted average age of the women 21 to 44 was calculated, by five year periods. This average will hereafter be referred to as B.

The relationship between average age (B) and the age distribution index (G) is shown in Table 5.

TABLE 5 DISTRIBUTION ACCORDING TO AVERAGE AGE (B) AND AGE DISTRIBUTION (G) OF WOMEN 21-44 OF THE 32 STATES IN WHICH G LIES BETWEEN 179 AND 422							
Age Index (G)	Average Age (B)						Total
	31.00- 31.24	31.25- 31.49	31.50- 31.74	31.75- 31.99	32.00- 32.24	32.25- 32.49	
179-199	0	0	0	0	0	3	3
200-249	0	0	0	0	0	0	0
250-299	0	0	0	3	7	0	10
300-349	0	0	2	6	2	0	10
350-399	0	3	1	1	0	0	5
400-422	1	3	0	0	0	0	4
Total	1	6	3	10	9	3	32

The correlation $r_{BG} = -.985 \pm .009$. The regression equation of B on G is:

$$B = 31.80 \pm .01 - (.0046 \pm .0004)(G - 325 \pm 3) \pm .07^*$$

With such an exceedingly close correlation it seems safe to assume that the average ages of women 21 to 44 in Iowa counties may be derived from G in terms of the above regression formula. The range in average age of women 21-44 years of age in Iowa Counties, as thus calculated from the actual range of G in Iowa counties is only $1.12 \pm .07$ years, which would have a negligible effect upon fecundity. Hence the correlations r_{AG} do not indicate that the birth rate is an effect of the age distribution.

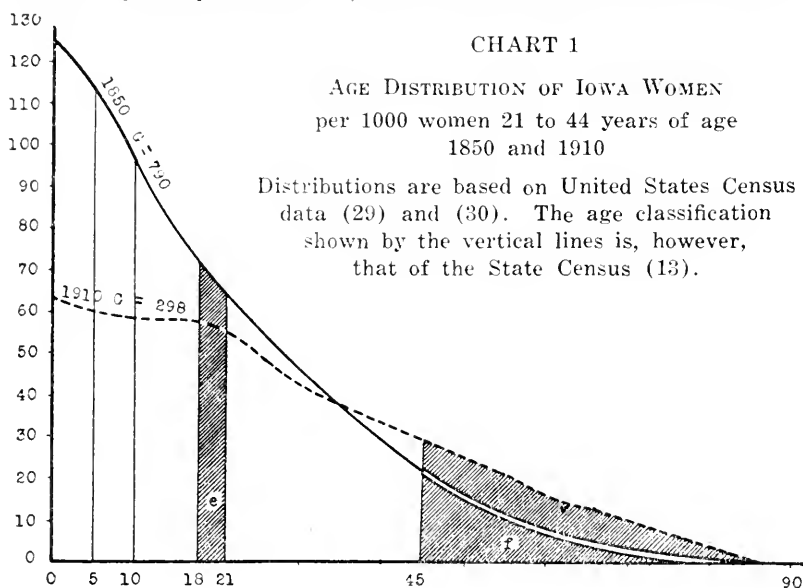
The second possible interpretation of the AG correlations is that

*See footnote on page 16

a high birth rate tends to produce the type of age distribution having a high value for G . It will be recalled that

$$G_x = 1,000 \frac{\text{number of women 18-20}}{\text{number of women 45+}} = \frac{1,000 e}{f},$$

where x represents the year for which G is calculated. (See Chart 1). In a community with no immigration or emigration, the women 18 to 20 at date x would have been 1 to 3 years old at a date 17 years previous to x , and the women 45 and over at date



x would have been 28 to 75, or thereabouts. If, in the $x-17$, the fecundity of women 21 to 44 were high, G would tend to be high in the year x , unless other factors, such as peculiarities in death rates, interfered. In other words, G_x tends to be correlated with $A_{(x-17)}$, and if a correlation exists between $A_{(x-17)}$ and A_x , a correlation may be expected between G_x and A_x . Extensive migration might, however, tend to break up this correlation.

Other factors besides the birth rate in preceding years, however, affect G . A high death rate among women over 20 years of age would tend to produce a high value of G . Now a high death rate of women over 20 might result from a high birth rate. It could

scarcely be a cause of a high birth rate. Under the first alternative deaths due to diseases caused by pregnancy and confinement come to mind. The Children's Bureau has shown that such deaths of mothers number approximately seven per 1,000 live births. A difference of several hundred in the fecundity rate, therefore, could account for only a very small variation in G as a result of deaths due directly to child birth. Bearing and caring for excessive numbers of children might, however, lower the resistance of mothers and hence promote high death rates from other causes. Probably of greater importance is the well known correlation between poverty and high death rates from tuberculosis and other causes.

On this last point data collected by Dublin for the Metropolitan Life Insurance Company are significant (5). He compares death rates among Metropolitan Industrial policy holders, and persons of the same ages, sexes and races in the United States Registration Area. As to differences between these policy holders and the general population he indicates that the industrial policy holders represent a group definitely below the average of the country in economic status, but typical of the industrial population rather than typical of the poverty-stricken. Women in this group 20 to 74 years of age show mortality rates, by five year age groups, from six to 29 per cent higher than women in the registration area of the United States. (5, p. 23). In a stationary population the mortality rates shown would result in an age distribution, among the women of industrial policy holding families, represented by $G=151$. For the Registration Area the corresponding index is $G=142$. This difference would, of course, be much more marked if the comparison were made between wage earners and persons of the professional and capitalistic classes than when made between wage earners and the general population, and would be still higher if a comparison of distinctly rich and poor classes were made.

For a more extreme comparison between the adult female age distributions of poor and average well-to-do groups, the contrast between the colored and white populations may be cited. Dublin shows that colored females of the Metropolitan families had, in the age group 20 to 24, a mortality 238.5 per cent as large as that of white women of the same age, and that while this difference decreased steadily in each successive age group, its lowest point was

105.1 per cent of the white rate (5, p. 18). The effect of this difference in adult female death rates upon the G index may be determined directly from the United States Census. The following values of G and A are derived from the 1910 census (29, pp. 307, 310, 356, 542).

	G	A
All white females in the United States, 1910.....	323	644
All negro females in the United States, 1910.....	533	718
All negro females in South Atlantic Division, 1910.....	549	815
All Indian females in the United States, 1910.....	373	1092

The total negro population of the United States is not affected appreciably by immigration and emigration, as I have shown elsewhere, (9, pp. 29-30), though the white population is. The high value of the G index for negroes is not due to extremely high net fecundity, judging by the 1910 and 1900 rates. The negro fecundity rate in 1900 was 822, according to the United States Census (29, p. 319).

Clearly, the difference between the values of G for white and colored women must be the result chiefly of the difference in death rates, and while some may urge that this is the effect of racial differences, a more plausible hypothesis is that it results from the notoriously unfavorable economic sanitary and social conditions under which negroes live.

The above evidence shows that a high value of G tends to indicate unfavorable economic and industrial conditions, resulting in a high adult female death rate and hence that the high AG correlations may be explained in considerable part in terms of correlation between poverty and a high birth rate. This conclusion is in harmony with Heron's findings (10).

As another possibility it should be noted that the migration rate (as is indicated by analysis of data contained in (9) is probably much higher at the ages 18 to 20 than at the ages 45 and over: hence a community gaining in its female population through migration would tend to have a high G index, while one losing through migration would have a low G.

To summarize the discussion of the AG correlations, it seems clear that the relationship between fecundity and the age distribution of the women is due, not to differences in the average age of women 21 to 44, but to other factors. Correlation between present

fecundity and fecundity 17 years or so ago is undoubtedly an element. Higher fecundity of migrant than non-migrant stock may be partly responsible, though my study of interstate migration failed to reveal this characteristic among recent migrants (9, p. 50). The most probable explanation appears to lie in the high death rate among women of the poorer classes; the AG correlation is probably a correlation between poverty and fecundity. Analysis of the M and P indices later in this study supports this conclusion.

7. *Iowa's Declining Fecundity.* For the analysis of causes related to the decline in fecundity in Iowa only the G and D indices can be readily ascertained for several decades ago. The linear regression equation for predicting fecundity of Iowa Counties in 1915 on the basis of G and D is

$$A'_{DG}=612\pm5-(3.33\pm.15)(D-46\pm1)+(.99\pm.06)(G-286\pm3)\pm37^*$$

In 1850 in Iowa, $G=790$, and D was approximately nine (30). Substituting these values, the fecundity prediction for Iowa in 1850 would be 1238 ± 49 . The actual fecundity was 1,231. For the United States in 1850, $G=527$; $D=20$ (approximately); and the predicted fecundity is 938 ± 41 . The actual fecundity was 927. For whites in the United States in 1910, $G=323$; $D=62.5$; and the predicted fecundity is 594 ± 39 . The actual fecundity is 644.

The first two of these predictions are within fractions of the respective probable errors of estimate; the last exceeds the error of estimate by less than one-third. The exact significance of this rather surprising accuracy is, however, difficult to determine. In 1850 the age distribution in Iowa was greatly affected by migration, and in those days migrants were more fertile than non-migrants. The average age of the women 21 to 44 was less than a year lower in 1850 than in 1910.

14. *Home-Ownership and Fecundity.* All of the AM correlations where D is assigned, except one, are negative, and all of the AM correlations where D is not assigned, except one, are positive. The exceptions are within their probable errors of zero. The fact that $r_{AM}=+.21\pm.06$ indicates that there is a tendency for counties with large percentages of home owners among the middle-aged to have high fecundities, but the fact that $r_{AM,D}=-.37\pm.07$ indicates that, taking urban and rural conditions separately, home

*See footnote on page 16.

ownership and fecundity are correlated negatively. The inversion is due to the fact that more rural than urban persons own homes ($r_{DM} = -.56 \pm .05$).

TABLE 6 AM CORRELATIONS					
r_{AM}	$+.21 \pm .06$	$r_{AM\ DJNOP}$	$-.18 \pm .07$	$r_{AM\ JLNOP}$	$+.11 \pm .07$
$r_{AM\ D}$	$-.37 \pm .06$	$r_{AM\ DIP}$	$-.20 \pm .06$	$r_{AM\ L}$	$+.26 \pm .06$
$r_{AM\ DG}$	$+.04 \pm .07$	$r_{AM\ DJNOP}$	$-.12 \pm .07$	$r_{AM\ LNOP}$	$+.41 \pm .06$
$r_{AM\ DGI}$	$-.03 \pm .07$	$r_{AM\ DOP}$	$-.13 \pm .07$	$r_{AM\ N}$	$+.21 \pm .06$
$r_{AM\ DGIQ}$	$-.14 \pm .07$	$r_{AM\ DNOP}$	$-.12 \pm .07$	$r_{AM\ NOP}$	$+.40 \pm .06$
$r_{AM\ DGQ}$	$-.06 \pm .07$	$r_{AM\ G}$	$+.55 \pm .05$	$r_{AM\ O}$	$+.26 \pm .06$
$r_{AM\ DI}$	$-.42 \pm .06$	$r_{AM\ GI}$	$+.47 \pm .06$	$r_{AM\ OP}$	$+.39 \pm .06$
$r_{AM\ DIJLNOP}$	$-.17 \pm .07$	$r_{AM\ GI}$	$+.42 \pm .06$	$r_{AM\ P}$	$+.37 \pm .06$
$r_{AM\ DIJNOP}$	$-.19 \pm .07$	$r_{AM\ I}$	$+.03 \pm .07$	$r_{AM\ Q}$	$+.22 \pm .06$
		$r_{AM\ IJLNOP}$	$-.02 \pm .07$		

A clearer idea of the significance of these correlations may be gained from the regression equation

$$A'_{DM} = 612 \pm 5 - (5.4 \pm .3)(D - 46 \pm 1) - (1.0 \pm .2)(M - 143 \pm 2) \pm 34.$$

In an urban area, where half of the adults 21 to 44 years of age owned homes, the predicted fecundity would, according to this equation, be -37 ± 72 , (or approximately zero) as compared with 463 ± 45 in an urban area where no such persons owned homes. In a rural territory where half of the persons 21 to 44 owned homes the predicted fecundity would be 503 ± 71 as compared with 1003 ± 45 in a wholly tenant rural community. Even allowing for the possibility of curvilinear regression, these predictions indicate that, when rural-urban distribution is constant, variations in home ownership are associated inversely with very striking differences in fecundity.

It seems probable that the relationship between home ownership and fecundity in the city differs from the corresponding relationship in rural areas. In the country, of course, home ownership is practically identical with farm ownership. Linear partial regressions do not indicate such differences. In order to isolate this problem the correlation between A and M was studied in the 31 counties having less than 40 per cent urban population. In these counties $r_{AM} = -.67 \pm .07$, and

$$A'_M = 664 \pm 11 - (1.7 \pm .2)(M - 157 \pm 4) \pm 30.$$

When M is 500, A'_M is 81 ± 77 ; when M is zero, A'_M is 931 ± 45 . Although the very low prediction for areas where all homes are

owned is doubtless an exaggeration, due to curvilinear regression, there can be little doubt that tenant farmers are reproducing much more rapidly than farm owners. If the counties with 40 or more per cent urban are considered, $r_{AM}=+.33\pm.07$, but this correlation is probably due to the DM correlation already pointed out. If the 11 counties with 70 or more per cent urban are considered $r_{AM}=+.13\pm.20$, which, of course, is practically zero. It seems evident, then, that home ownership has little or no relationship with fecundity in cities, but a very high relationship with fecundity in rural districts. Probably home ownership, apart from the farm ownership which it implies in rural districts, is not a good index of economic status, since many rather poor workmen in cities buy homes on the installment plan, while many very wealthy people rent their dwellings. The high fecundity of tenant farmers as compared with farm owners has been shown by Kolb (18) and Dunlop (8).

The relationship between delayed marriage and the low fecundity of farm owners is not evident. Married persons are more likely to own homes than are unmarried persons; $r_{IM}=+.39\pm.06$.

9. *Educational Status and Fecundity.* Three of the indices used in this study relate to educational status, namely, J, O, and L. The J index is the number of males 10 to 18 years of age attending school nine months or more, per 1,000 males of these ages. The AJ correlations which have been worked out are shown in Table 7.

TABLE 7
AJ CORRELATIONS

r_{AJ}	$-.52\pm.05$	$r_{AJ,DMOP}$	$-.02\pm.07$	$r_{AJ,LMNOP}$	$-.59\pm.04$
$r_{AJ,D}$	$+.07\pm.07$	$r_{AJ,DNOP}$	$+.03\pm.07$	$r_{AJ,M}$	$-.50\pm.05$
$r_{AJ,DG}$	$-.08\pm.07$	$r_{AJ,DOP}$	$+.01\pm.07$	$r_{AJ,MN}$	$-.51\pm.05$
$r_{AJ,DGI}$	$-.08\pm.07$	$r_{AJ,G}$	$-.66\pm.04$	$r_{AJ,MNOP}$	$-.48\pm.05$
$r_{AJ,DGIQ}$	$-.00\pm.07$	$r_{AJ,GI}$	$-.59\pm.04$	$r_{AJ,MOP}$	$-.48\pm.05$
$r_{AJ,DI}$	$+.07\pm.07$	$r_{AJ,I}$	$-.42\pm.06$	$r_{AJ,N}$	$-.53\pm.05$
$r_{AJ,DILMNOP}$	$-.06\pm.07$	$r_{AJ,ILMNOP}$	$-.47\pm.05$	$r_{AJ,NOP}$	$-.59\pm.05$
$r_{AJ,DIMNOP}$	$-.07\pm.07$	$r_{AJ,ILNOP}$	$-.52\pm.05$	$r_{AJ,O}$	$-.54\pm.05$
$r_{AJ,DINOP}$	$-.01\pm.07$	$r_{AJ,IMNOP}$	$-.47\pm.05$	$r_{AJ,OP}$	$-.59\pm.04$
$r_{AJ,DIOP}$	$+.01\pm.07$	$r_{AJ,LMN}$	$-.54\pm.05$	$r_{AJ,P}$	$-.58\pm.05$
$r_{AJ,DLMN}$	$-.09\pm.07$	$r_{AJ,LMNOP}$	$-.48\pm.05$	$r_{AJ,Q}$	$-.43\pm.05$
$r_{AJ,DMNOP}$	$-.01\pm.07$	$r_{AJ,LMOP}$	$-.49\pm.05$		

For all partials of r_{AJ} where D is assigned, the correlations are practically 0. For all partials of r_{AJ} where D is not assigned, the values are $-.42 \pm .06$ or higher. It is clear, therefore, that while counties with large percentages of male school attendance for nine months or more per year have decidedly fewer children than counties with lower standards, the difference is wholly due to the fact that urban counties also have the lowest fecundity.

High School Attendance. Q represents the high school attendance per 1,000 persons 10 to 17 years of age. The AQ correlations are shown in Table 10.

TABLE 8					
AQ CORRELATIONS					
r_{AQ}	$-.42 \pm .06$	$r_{AQ, DIP}$	$-.23 \pm .06$	$r_{AQ, J}$	$-.28 \pm .06$
$r_{AQ, D}$	$-.33 \pm .06$	$r_{AQ, DP}$	$-.21 \pm .06$	$r_{AQ, L}$	$-.39 \pm .06$
$r_{AQ, DG}$	$-.17 \pm .07$	$r_{AQ, G}$	$+.32 \pm .06$	$r_{AQ, M}$	$-.42 \pm .06$
$r_{AQ, DGI}$	$-.21 \pm .06$	$r_{AQ, GI}$	$-.35 \pm .06$	$r_{AQ, N}$	$-.42 \pm .06$
$r_{AQ, DI}$	$-.35 \pm .06$	$r_{AQ, I}$	$-.45 \pm .07$	$r_{AQ, O}$	$-.41 \pm .06$
$r_{AQ, DIL}$	$-.26 \pm .06$			$r_{AQ, P}$	$-.38 \pm .06$

Q, although also an educational index, is not influenced by the length of the official school year and the efficiency of attendance officers, which form considerable elements in J. Q shows rather the extent of the desire and ability of parents to secure for their children a high school education. One of the factors conditioning the sending of children through high school is certainly the economic status of the parents. Since therefore both G and Q are to some extent economic indices it is to be expected that partial correlations of either of them with A when the other is assigned will be lower than when the other is not assigned. This proves to be the case. In general, it may be concluded that counties where high school attendance is low have high fecundity, while where high school attendance is high fecundity is low, and that this is true when D is assigned.

Past Education Reported By Adults. L represents the number per 1,000 persons over school age who were reported as having had eight years or more of schooling. The AL correlations are given in Table 9.

In considering the significance of the above correlations, it must be remembered that the L index is built upon the unverified verbal statement of a member of the family to a census enumerator, and

is doubtless subject to systematic errors due to misstatements and exaggerations. It is the opinion of the writer, however, that these errors do not vitiate the results; the correlations are consistent enough to be accepted at least tentatively.

TABLE 9
AL CORRELATIONS

r_{AL}	$-.18 \pm .07$	$r_{AL.DIP}$	$-.23 \pm .06$	$r_{AL.JMNOP}$	$-.17 \pm .07$
$r_{AL.D}$	$-.34 \pm .06$	$r_{AL.DIQ}$	$-.28 \pm .06$	$r_{AL.M}$	$-.24 \pm .06$
$r_{AL.DG}$	$-.12 \pm .07$	$r_{AL.DJMNOP}$	$-.22 \pm .06$	$r_{AL.MN}$	$-.24 \pm .06$
$r_{AL.DGI}$	$-.16 \pm .07$	$r_{AL.DJNOP}$	$-.22 \pm .06$	$r_{AL.MNOP}$	$-.16 \pm .07$
$r_{AL.DGIQ}$	$-.11 \pm .07$	$r_{AL.DMNOP}$	$-.22 \pm .06$	$r_{AL.MOP}$	$-.15 \pm .07$
$r_{AL.DGQ}$	$-.08 \pm .07$	$r_{AL.DNOP}$	$-.22 \pm .06$	$r_{AL.N}$	$-.18 \pm .07$
$r_{AL.DI}$	$-.37 \pm .06$	$r_{AL.DOP}$	$-.21 \pm .06$	$r_{AL.NOP}$	$-.12 \pm .07$
$r_{AL.DJMNOP}$	$-.21 \pm .06$	$r_{AL.DQ}$	$-.25 \pm .06$	$r_{AL.O}$	$-.17 \pm .07$
$r_{AL.DJNOP}$	$-.22 \pm .06$	$r_{AL.G}$	$+.01 \pm .07$	$r_{AL.OP}$	$-.11 \pm .07$
$r_{AL.DIMNOP}$	$-.21 \pm .06$	$r_{AL.I}$	$-.27 \pm .06$	$r_{AL.P}$	$-.11 \pm .07$
$r_{AL.DINOP}$	$-.22 \pm .06$	$r_{AL.IJMNOP}$	$-.16 \pm .07$	$r_{AL.Q}$	$-.05 \pm .07$
$r_{AL.DIOP}$	$-.24 \pm .06$	$r_{AL.IMNOP}$	$-.15 \pm .07$		

Although J and Q, the indices of present educational status, are positively correlated with D, indicating that city children are getting better educational advantages than rural, r_{DL} is practically zero. This means that rural adults report themselves as having had eight years or more of schooling just about as often per 1,000 as city adults. With L, as in the case of other indices, the assignment of G greatly reduces the correlation with fecundity. G and L are negatively correlated ($r_{GL} = -.36 \pm .06$). Both G and L appear to be associated with low economic status, one positively, the other negatively.

The significance of the educational indices Q and L is clearer when studied in regression form. The regression coefficients of fecundity on Q and L respectively when D and I are constant are $b_{AQ.DIL} = -.20 \pm .05$ and $b_{AL.DIQ} = -.32 \pm .08$. The error of estimate in predicting A from D, I, L, and Q is ± 31 . These coefficients mean that, assuming D and I as constant, and neglecting the possibility of curvilinear correlation, a community in which all children of high school age attended high school, and in which all persons over school age reported having had eight years or more of schooling, fecundity rates would tend to be 420 ± 90 lower than in a community where no children attended high school and no persons over school age reported having had eight years or more

of schooling. Of the 420 difference, 320 would be assignable to factors correlated with L, and only 100 to factors correlated with Q, in spite of the fact that the partial correlations $r_{AQ,DI}$ and $r_{AL,DI}$ are very nearly equal. The data thus indicate clearly that educational status, especially past schooling, is very definitely inversely correlated with fecundity.

TABLE 10
AN CORRELATIONS

r_{AN}	$+.01 \pm .07$	$r_{AN,DIOP}$	$+.15 \pm .07$	$r_{AN,ILMOP}$	$-.03 \pm .07$
$r_{AN,D}$	$+.08 \pm .07$	$r_{AN,DIP}$	$+.25 \pm .06$	$r_{AN,LMOP}$	$-.11 \pm .07$
$r_{AN,DG}$	$-.09 \pm .07$	$r_{AN,DJLMOP}$	$-.10 \pm .07$	$r_{AN,M}$	$+.03 \pm .07$
$r_{AN,DGI}$	$+.13 \pm .07$	$r_{AN,DMOP}$	$-.08 \pm .07$	$r_{AN,MOP}$	$-.09 \pm .07$
$r_{AN,DGIQ}$	$+.11 \pm .07$	$r_{AN,DOP}$	$-.09 \pm .07$	$r_{AN,O}$	$-.03 \pm .07$
$r_{AN,DGQ}$	$-.12 \pm .07$	$r_{AN,G}$	$-.11 \pm .07$	$r_{AN,OP}$	$-.05 \pm .07$
$r_{AN,DI}$	$+.24 \pm .06$	$r_{AN,I}$	$+.34 \pm .06$	$r_{AN,P}$	$-.03 \pm .07$
$r_{AN,DJLMNOP}$	$+.16 \pm .07$	$r_{AN,IJLMOP}$	$+.29 \pm .06$	$r_{AN,Q}$	$-.06 \pm .07$

10. *Religious Indices. Proportion Catholic.* The N index, it will be remembered, is the percentage of the population reported as being members of Catholic churches. The AN correlations become appreciably greater than their probable errors only when the proportion married is assigned. The correlation $r_{AN,I} = +.34 \pm .06$ is high enough to be definitely significant. The original reports as to church membership may, of course, be in error. The statistics of churches appear to have been somewhat carelessly handled by the state census office. The total number of church members for Winneshiek County is reported as 177,185, although the sum of the memberships of the various denominations as given for that country is 10,235. Similarly the total given for Woodbury County is 617,087 instead of 20,087, and for Wright County is 167,304 instead of 5,954. (13, pp. 733-4). It is possible that other errors occurred and were not discovered; if this were true it would probably tend to lower the correlations. From the data as they stand with the above corrections, however, it seems probable that the tendency of married Catholics to have more children than married non-Catholics is offset by the fact that Catholics in Iowa tend to marry later than non-Catholics ($r_{IN} = -.51 \pm .05$).

Proportion Protestant. The O index—of non-Catholic church members per 1,000 of population—is open to the same doubts as to accuracy as is the N index. The highest AO correlation is

TABLE 11
AO CORRELATIONS

r_{AO}	$-.09 \pm .07$	$r_{AO,DJLMNP}$	$-.13 \pm .07$	$r_{AO,JLMNP}$	$-.12 \pm .07$
$r_{AO,D}$	$-.26 \pm .06$	$r_{AO,DIP}$	$-.25 \pm .06$	$r_{AO,LMN}$	$-.20 \pm .06$
$r_{AO,DG}$	$+.03 \pm .07$	$r_{AO,DJLMNP}$	$-.14 \pm .07$	$r_{AO,M}$	$-.18 \pm .07$
$r_{AO,DGI}$	$-.06 \pm .07$	$r_{AO,DLMN}$	$-.16 \pm .07$	$r_{AO,MN}$	$-.18 \pm .07$
$r_{AO,DGIQ}$	$-.00 \pm .07$	$r_{AO,G}$	$+.14 \pm .07$	$r_{AO,N}$	$-.09 \pm .07$
$r_{AO,DGQ}$	$+.09 \pm .07$	$r_{AO,I}$	$-.26 \pm .06$	$r_{AO,P}$	$-.03 \pm .07$
$r_{AO,DI}$	$-.33 \pm .06$	$r_{AO,IJLMNP}$	$-.11 \pm .07$	$r_{AO,Q}$	$+.05 \pm .07$
		$r_{AO,JLMN}$	$-.14 \pm .07$		

$r_{AO,DI} = -.33 \pm .06$. This negative correlation disappears when G is kept constant, and is quite low when M is constant, indicating that the tendency for Protestants to have fewer children than non-Protestants is due to incidental economic and educational rather than religious differences.

TABLE 12
AP CORRELATIONS

r_{AP}	$+.21 \pm .06$	$r_{AP,DJLMNO}$	$+.30 \pm .06$	$r_{AP,JLMN}$	$+.29 \pm .06$
$r_{AP,D}$	$+.48 \pm .05$	$r_{AP,DLMN}$	$+.31 \pm .06$	$r_{AP,JLMNO}$	$+.29 \pm .06$
$r_{AP,DG}$	$-.10 \pm .07$	$r_{AP,DQ}$	$+.42 \pm .06$	$r_{AP,LMN}$	$+.33 \pm .06$
$r_{AP,DGI}$	$+.00 \pm .07$	$r_{AP,G}$	$-.27 \pm .06$	$r_{AP,M}$	$+.37 \pm .06$
$r_{AP,DGIQ}$	$-.03 \pm .07$	$r_{AP,I}$	$+.40 \pm .06$	$r_{AP,MN}$	$+.37 \pm .06$
$r_{AP,DGQ}$	$-.13 \pm .07$	$r_{AP,IG}$	$-.08 \pm .07$	$r_{AP,N}$	$+.21 \pm .06$
$r_{AP,DI}$	$+.55 \pm .05$	$r_{AP,IJLMNO}$	$+.38 \pm .06$	$r_{AP,O}$	$+.20 \pm .06$
$r_{AP,DJLMNO}$	$+.38 \pm .06$	$r_{AP,J}$	$+.36 \pm .06$	$r_{AP,Q}$	$+.12 \pm .07$
$r_{AP,DIQ}$	$+.50 \pm .05$				

11. *Fecundity of the Foreign-Born.* A positive correlation appears between fecundity and the proportion of foreign-born in every case except where the G index of age distribution is assigned. $r_{AP} = +.21 \pm .06$, and $r_{AP,DI} = +.55 \pm .05$. The difference between these two coefficients is due to two factors: first that the slight concentration of the foreign-born in cities tends to cover up their high fecundity as compared with the native-born, and second that the proportion married is negatively correlated with proportion of foreign-born ($r_{IP} = -.27 \pm .06$). This seems at first in contradiction to the well-known fact that foreign-born women marry earlier than native women; see Hart (9, p. 125). The explanation perhaps is that where foreign men are in excess native women have fewer attractive opportunities to marry.

In terms of a partial regression, $b_{AP,DI} = +.62 \pm .06$, with an error of estimate of $\pm .30$. The whole theoretical range of P (1,000 points) therefore corresponds with a difference of 620 ± 61 in fecundity. If D and I were at their average values, a wholly foreign-born community would have a fecundity of $1,166 \pm 62$, while a community entirely native-born would have a fecundity of 546 ± 31 . This contrast is in harmony with what is known of the relative fecundity of native and foreign mothers. See (11), (19), (37), (38).

The most striking fact about these AP correlations is that the well known tendency of the foreigner to be prolific disappears entirely if the age distribution index G is assigned ($r_{AP,DGI} = +.00 \pm .07$). This fact leads to an analysis of the reasons for the high correlation $r_{GP} = +.70 \pm .04$. For the nine counties having the largest percentages of foreign-born residents in 1915 the values of G were calculated separately for the native-born of native parents, native-born of foreign or mixed parentage, foreign-born, and all persons of foreign parentage. The results are shown in comparison with similar data for the state as a whole in Table 13.

	Native-born of native parentage	Native-born of foreign or mixed parentage	Foreign-born	All persons of foreign parentage
Nine counties with the largest percentage of foreign-born	543	966	52	314
The state as a whole	360	388	35	204

As to age distribution the foreign-born of these nine counties are clearly not typical of the foreign-born of the state as a whole, but tend to have markedly younger women. This youthfulness extends also to the other nativity groups in these counties. The explanation for these facts seems to be that foreigners tend decidedly to migrate into communities where economic conditions, as reflected by the G index, are unfavorable. Apart from their poverty, as shown by this index, the foreign-born appear to be no more fertile than the native-born. Differential fecundity as

between nativity groups seems from these partial correlations to be due to economic and educational differences rather than to biological racial differences.

TABLE 14
AI CORRELATIONS

r_{AI}	$+.48 \pm .05$	$r_{AI.DOP}$	$+.41 \pm .06$	r_{AILMN}	$+.54 \pm .05$
$r_{AI.D}$	$+.21 \pm .06$	$r_{AI.DP}$	$+.37 \pm .06$	$r_{AILMNOP}$	$+.57 \pm .05$
$r_{AI.DG}$	$+.35 \pm .06$	$r_{AI.DPQ}$	$+.41 \pm .06$	r_{AILMOP}	$+.55 \pm .05$
$r_{AI.DGM}$	$+.35 \pm .06$	$r_{AI.DQ}$	$+.25 \pm .06$	r_{AILNOP}	$+.64 \pm .04$
$r_{AI.DGQ}$	$+.37 \pm .06$	$r_{AI.G}$	$+.57 \pm .05$	$r_{AI.M}$	$+.44 \pm .05$
$r_{AI.DJLMNOP}$	$+.44 \pm .05$	$r_{AI.JLMN}$	$+.54 \pm .05$	$r_{AI.MN}$	$+.53 \pm .05$
$r_{AI.DJLMNO}$	$+.41 \pm .06$	$r_{AI.JLMNO}$	$+.53 \pm .05$	$r_{AI.MNOP}$	$+.58 \pm .05$
$r_{AI.DJLMNP}$	$+.47 \pm .05$	$r_{AI.JLMNOP}$	$+.57 \pm .05$	$r_{AI.MOP}$	$+.54 \pm .05$
$r_{AI.DJMNOP}$	$+.45 \pm .06$	$r_{AI.JLMNP}$	$+.58 \pm .05$	$r_{AI.N}$	$+.56 \pm .05$
$r_{AI.DJNOP}$	$+.43 \pm .06$	$r_{AI.JLMOP}$	$+.51 \pm .05$	$r_{AI.NOP}$	$+.64 \pm .04$
$r_{AI.DLMN}$	$+.40 \pm .06$	$r_{AI.JLNOP}$	$+.58 \pm .05$	$r_{AI.O}$	$+.52 \pm .05$
$r_{AI.DMNOP}$	$+.44 \pm .05$	$r_{AI.JMNOP}$	$+.57 \pm .05$	$r_{AI.P}$	$+.57 \pm .05$
$r_{AI.DMOP}$	$+.42 \pm .06$	$r_{AI.J}$	$+.36 \pm .06$	$r_{AI.PQ}$	$+.56 \pm .05$
$r_{AI.DNOP}$	$+.43 \pm .06$	$r_{AI.L}$	$+.51 \pm .05$	$r_{AI.Q}$	$+.50 \pm .05$

12. *Fecundity and Proportion Married.* The lowest AI correlation is $+.25 \pm .06$, so that a positive correlation is, as might have been expected, clearly established. Fecundity tends to be highest, other things being equal, where the largest proportion of the women are married.

13. *General Interpretation of Fecundity Correlations.* Important factors conditioning the fecundity of Iowa women may be classified, relative to this investigation, under four heads:

1. The factors of age distribution, urban or rural residence, percentage married, and percentage of persons of high school age attending high school.
2. Factors correlated with the indices listed under 1, such as high previous fecundity in the community, high adult female death rate, percentage of population foreign-born, percentage of middle aged persons owning homes, Catholic and Protestant religious affiliations, percentage of male children of school age attending school nine months or more in preceding year, and percentage of persons over school age reported as having had eight years or more of schooling.
3. Factors which are independent of the factors listed under 1, and which vary markedly as between Iowa counties in 1915.

4. Factors which are independent of the factors listed under 1, and which vary, or might vary, markedly as between families, but which do not vary greatly as between Iowa counties in 1915.

Intelligent appraisal of the results of this study depends to a considerable extent upon the determination of the relative importance of these four groups of factors. For this purpose multiple regression equations, predicting A in terms of other variables, are requisite. The most important of these equations are the following:*

$$\begin{aligned} A'_{DIJLMNOP} &= 612 \pm 6 - (4.0 \pm .3)(D - 46 \pm 1) + (.70 \pm .10)(I - 746 \pm 3) \\ &\quad - (.03 \pm .04)(J - 467 \pm 8) - (.13 \pm .04)(L - 703 \pm 5) \\ &\quad - (.46 \pm .18)(M - 143 \pm 2) + (.11 \pm .05)(N - 80 \pm 5) \\ &\quad - (.09 \pm .04)(O - 253 \pm 5) + (.42 \pm .07)(P - 106 \pm 3) \pm 28. \\ A'_{DGIQ} &= 612 \pm 6 - (3.5 \pm .2)(D - 46 \pm 1) + (.74 \pm .05)(G - 286 \pm 3) \\ &\quad + (.38 \pm .07)(I - 746 \pm 3) - (.18 \pm .06)(Q - 164 \pm 3) \pm 23. \\ A'_{DGI} &= (1 + .000776 \text{ i})(.79g + 1.34 \text{ D} - .048 \text{ D}^2 - 662) \pm 23. \\ A'_{DGI} &= (1 + .000775 \text{ i})(I + .00241 \text{ c})(650 + 1.7 \text{ D} - .05 \text{ D}^2) \pm 23. \end{aligned}$$

In the above equations capital letters stand for the original items and small letters for deviations from the respective arithmetic means of the corresponding indices. The last number in each equation is the probable error of estimate. In the last equation a new index C is introduced, consisting in 1,000 times the number of women 18 to 20 years of age, divided by the number 18 to 20 plus the number of women over 44 years. If the G index is $\frac{1000}{f}e$, the C index is $\frac{1000}{e + 1}e$.

The best summary statement of the accuracy with which these various regression equations predict fecundity is the correlation of each series of predictions with the corresponding actual fecundities. These may be calculated readily from the errors of estimate of the regression equations and the standard deviation of the fecundities. Between the actual fecundities and the predictions from the D, I, J, L, M, N, O, and P indices the correlation is $+.86 \pm .02$. Between actual fecundities and the predictions from the D, G, I, and Q indices the correlation is $+.91 \pm .01$. The correlations between actual fecundities and predictions from the D, G, and I indices, and between actual fecundities and predictions

*In these, as in previous, regression equations, the probable errors of the means and of the regression coefficients are given after their respective quantities, with \pm signs, and the probable error of estimate is given at the end of each equation with a \pm sign before it.

from the D, C, and I series are also $+.91 \pm .01$. The probable errors of these correlations are derived by the usual formula.

The size of these correlations shows that factors in group 3 on page 31 are practically negligible as compared with factors in groups 1 and 2.

14. *Curvilinear Regressions.* Thus far the discussion has been confined to rectilinear regressions. The assumption of rectilinearity is, however, misleading. If, in the equation for predicting A from D, I, J, L, M, N, O, and P the theoretical extremes of all the variables, corresponding with the lowest fecundity, are substituted, the predicted fecundity becomes -466 ± 108 , which is of course absurd. Such a prediction should represent the fecundity of a community consisting entirely of unmarried, well educated, home owning, native-born city folks. Such a community would have a certain illegitimate birth rate, and a certain number of adopted children. At the least it could not have less than no children at all. In the equation for predicting A from D, G, I, and Q, while G, strictly speaking has no definite limit, the same possibility of a prediction of negative fecundity appears.

The reason for this irrationality at the lower extremes seems to be that the effect of the proportion married on fecundity is to be measured by multiplication rather than addition. If the proportion married became zero the fecundity would drop approximately to the illegitimate rate, and the absolute effects of other conditions would be very much smaller than in a population where all women of marriageable age were married. The equations predicting A from D, G, and I, and from D, C, and I, attempt to meet this difficulty. It will be noted that, in spite of not using the variable Q, these equations fit the data slightly better than the second equation. Moreover, assuming G and C as being 0, the lowest possible predictions from the equations involving curved regression surfaces are 40 and 63 respectively, as compared with -127 as the lowest rectilinear prediction from D, G, I, and Q.

The prediction of A from R, I, J, L, M, N, O, and P fits much less closely than the other three equations do. The age index more than takes the place of the religious, economic, educational and nativity indices. The implication seems to be that the age index better reflects the economic and intellectual factors associated with fecundity than do the omitted indices.

While the above argument proves the unimportance of factors which vary markedly from county to county and which are uncorrelated with D, G, and I, it is not possible to prove that the correlation of A with D, G, and I may not be due to some variable not measured in the investigation. The factors still remain which, while they vary little as between Iowa counties, do or might vary greatly as between individual families. Sterility due to venereal disease may, perhaps, be a case in point, though, on the other hand, venereal disease may be correlated with the percentage of urban population, the percentage married, and the age distribution, and so fall into one of the preceding groups of factors. Innumerable other factors, however, such as presence or absence of essential elements in diet, prevalence of sterilization by surgical means, the introduction of new methods of contraception, fluctuations in fashion, the onset and duration of war, biological changes due to selective factors now at work, and so on indefinitely, while they have been proven to exert little independent differential influence on fecundity as between Iowa Counties in 1915, might conceivably have profound influence upon fecundity within counties in 1915, or in Iowa at some other date, or in other localities at any time.

IV. CONCLUSIONS

14. *Summary.* The fecundity of Iowa Counties may be predicted best from three variables among those experimented with: namely, percentage of urban population (D), proportion of women married (I), and steepness of adult female age distribution (G). These three factors, and conditions correlated with them, are responsible for at least five-sixths of the variation between Iowa counties in the number of children under five years per 1,000 women 21 to 44 years of age. City people have fewer children than rural, and unmarried women, of course, have fewer than married women. The significance of the G index seems to be as follows: Poor people have high birth rates and high adult female death-rates. The poor in one generation tend to be the parents of the poor in the next generation. There thus arises a more or less continuous poor class with a steep female age distribution, reflected in a high G index. In rural districts poor people are tenant farmers; hence their M index is low. Poor people leave school early, hence their Q and L indices are low. Foreign-born immi-

grants are mostly poor, and migrate into poor districts; hence indices G and P are associated. The fact that the correlations of A with L, M, N, O, P, and Q are practically negligible when G is constant means that all of these correlations express the same fact, namely that the poor and ill-educated—the unsuccessful in a word—are the highly fecund class. Doubtless also the rearing of children interferes with economic success. G appears to be the best available summary index of this condition. It might well be called the index of misery.

The types of individual, then, who are becoming parents most extensively in Iowa are the tenant farmer, the foreigner, and the badly educated. The types most meagerly participating in the bearing and rearing of the next generation are the economically successful, the native-born, the highly educated, and the city dwellers. These differences in fecundity are so radical that they cannot fail to have a profound effect upon the types of children produced, upon the sort of home and community environments provided for them, and hence upon the trend of character of the Iowa population.

Such conditions, in coöperation with the selective emigration to cities and to other states pointed out in a previous study (9) tend strongly to aggravate the danger of progressive social deterioration in the least favored rural areas of the State.

15. *Recommendations.* The first need in connection with this problem is for further research. The counties of the state furnish only 99 items—a number too small for really satisfactory analysis by means of partial correlations. The counties are, moreover, too large, and vary too little among themselves in many respects, to permit safe generalizations about regressions at the extremes of the theoretical ranges, or to determine the nature of the curvilinear regressions which undoubtedly represent the true relationships.

Research along the following lines is called for:

1. Securing of accurate detailed social data for several thousand individual families, with a view to analysis of their fecundities in correlation with factors indicative of their success and desirability as parents, and as to the conditions which encourage and discourage fecundity.

2. Analysis of these data with a view to expressing fecundity

in terms of a curvilinear regression equation with an error of estimate approaching zero.

3. Formulation of definite social policies on the basis of these findings, with a view to counteracting the menace of progressive deterioration in the quality of parenthood.

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STUDIES IN CHILD WELFARE

VOLUME II

NUMBER 3

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PUBLISHED BY THE UNIVERSITY, IOWA CITY

Issued semi-monthly throughout the year. Entered at the postoffice at Iowa City, Iowa, as second class matter. Acceptance for mailing at special rates of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

UNIVERSITY OF IOWA STUDIES IN CHILD WELFARE

PROFESSOR BIRD T. BALDWIN, Ph. D., EDITOR

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FOREWORD

Without controversy or propaganda, this study presents in conveniently useful form information which social workers, legislators, school authorities, public officials, employers, and parents will find useful in their efforts to improve the protection of child life in Iowa.

The tentative standards adopted by a conference called by the United States Children's Bureau are used as a general measuring rod by which we may evaluate child welfare legislation in Iowa. In many respects we fall short of the posited standards; in others we are far in advance.

The author has written from the sociological and not a legal point of view. Care has been taken to avoid errors in citing the statutes, although probably some minor errors have occurred.

The conception of the study and its general plan have been worked out by Dr. Hornell Hart of the Sociology Division of the Station. The detailed work and composition are the results of the efforts of Miss A. Ione Bliss, M. A., assistant in the Sociology Division.

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IOWA CHILD WELFARE LEGISLATION

I. PURPOSE AND PLAN OF STUDY

The following study is an effort to present a detailed comparison of Iowa statutes bearing on child welfare with the minimum standards adopted at the Children's Bureau Conferences, May and June, 1919.¹ These "Federal Standards," as they are hereinafter called, have been cited verbatim as the statements of opinion of experts in the field of child welfare, but no attempt has been made to pass judgment on their desirability. Many of these standards relate to subjects suitable for local administration rather than for state regulation, and wherever this is true the fact has been noted in the discussion.

Federal Standards and corresponding Iowa legislation have been given together in every case with a view to making it possible to determine at a glance Iowa's status in child legislation as measured by the best available standards. It is hoped that the study may furnish useful material for code commissions, legislators, bureaus of research in child welfare, social workers, publicists, city and state departments and other organizations and institutions laboring in the interests of Iowa children.

All statutes quoted are found in the Compiled Code of Iowa, 1919, unless otherwise noted, and all references are to sections of that Code. The technical phraseology has been followed wherever interpretation is doubtful, and any discussion of administration or interpretation of the laws has been avoided as not within the scope of this paper. Similarly, much excellent work which is being done by local organizations and societies has not been covered in the present study, which relates exclusively to state legislation.

This paper was prepared under the general supervision of Dr. Bird T. Baldwin, Director of the Iowa Child Welfare Research Station, and under the immediate direction of Dr. Hornell Hart, Head of the Sociological Division, to whom are due acknowledgment of much helpful assistance and criticism.

¹*Minimum Standards for Child Welfare.* Adopted by the Washington and Regional Conferences on Child Welfare, 1919. Conference Series No. 2, Bureau Publications No. 62; Washington, 1920.

II. MINIMUM STANDARDS FOR CHILDREN ENTERING EMPLOYMENT

1. AGE MINIMUM

(1) *Federal Standard*: The minimum age for employment should be 16 in any occupation, except that children between 14 and 16 may be employed in agriculture and domestic service during vacation periods.

Code of Iowa: The age minimum is 14 for specified occupations, (any mine, manufacturing establishment, factory, mill, shop, laundry, slaughter house, or packing house, or any store or mercantile establishment employing more than eight persons, or operation of any freight or passenger elevator, or livery stable or garage, or place of amusement, or distribution or transmission of messages) unless owned or operated by his parents. (882).

The age is 11 for boys and 18 for girls engaged in street occupations, in cities of 10,000 or over, with provision for issuing permits to boys under 11 in exceptional cases. (884).

Work permits required, between 11 and 16. (884).

(2) *Federal Standard*: The age should be 18 for employment in and about mines and quarries.

Code of Iowa: The age minimum is 16 for employment in or about mines during school term, (885) though boys 14 to 16 may be employed during school vacation provided a record be kept of all such boys, available for inspection at any time. (771, 13; 882).

(3) *Federal Standard*: The age minimum should be 21 for girls employed in messenger service.

Code of Iowa: The age minimum is 18 for transmission or distribution or delivery of goods or messages between 10 P. M. and 5 A. M. in any city of 10,000 or over. (886, 13). Boys under 16 may work only until 6 P. M. (886). No separate provision is made for girls.

(4) *Federal Standards*: Employment of minors in dangerous or hazardous occupations or at any work which will retard their proper physical or moral development should be prohibited.

Code of Iowa: No person under 16 is to be employed at anything at which, from the nature of the place or employment the health may be injured, or morals depraved, or at any work in which handling or use of gunpowder, dynamite, or other explosive is required, or in or about any mine during school term, or in any hotel, bowling alley, pool or billiard room, or any occupation dangerous to life or limb; and no female under 21 may be employed in any occupation requiring constant standing. (885).

No person under 16 and no female under 18 is permitted to clean machinery while in motion, and children under 16 are not to op-

erate or assist in operating dangerous machinery of any kind. (860).

The Code also provides that no badge or chauffeur's license shall be issued to children under 18 (3054, 39).

2. EDUCATIONAL MINIMUM

(1) *Federal Standard:* School attendance should be compulsory for all children between the ages of seven and 16 for at least nine months (38½ weeks) each year, either full or part time.

Code of Iowa: School attendance is compulsory for all children between ages of seven and 16, if in proper mental and physical condition to attend, for at least 24 consecutive weeks in each school year, but the board of directors in any city of first or second class may require attendance for the entire time school is in session.

This however does not apply to any child who is over 14 and legally and regularly employed, or who has educational qualifications equal to completion of eighth grade. (2663).

Every master is required to send his apprentice six years old or over, to school at least four months in each year. (6709).

Any person having control of a child seven to 14 years, inclusive, under private instruction, on receiving notice from the secretary of the school corporation, shall furnish certificate stating name, age, and period under private instruction; and any person having charge of a child physically and mentally unable to attend school shall furnish proofs by affidavit. (2664).

Provision for education of children in the county home at the district school. (3307). Provision for enforcing attendance act. (2668).

For reporting violations. (2669).

For punishing children habitually truant. (2670).

Deaf children, between the ages of seven and 19 years, are compelled to attend the Iowa School for the Deaf unless exempted, as provided, (2675, 2677), and the same law is applicable to blind children of like ages, (2680). The state board of education is empowered to employ an agent to aid in the enforcement of these provisions. (2678).

Children under ten years of age, so deaf as to be unable to attend public schools, may be taught by special instructors provided by the school corporation, such instruction to be substantially equivalent to that given other children of corresponding ages in graded schools, and provision is made for state aid. (2629, 2630).

(2) *Federal Standard:* Children between 16 and 18 who have completed eighth grade but not the high school grade and are legally and regularly employed should be required to attend day continuation school eight hours weekly.

Code of Iowa: School boards of directors may establish and maintain part-time schools, departments or classes in vocational or

other education for minors 14 to 16 holding work permits, or who have not completed eighth grade and are employed in a store or mercantile establishments where eight or fewer people are employed, or occupations owned by their parents, or who have completed eighth grade and are not engaged in some useful occupation; and the board is required to organize such part-time school, class or department wherever there are 15 minors as defined above resident in the district. (2583).

Such part-time schools are to be organized in accordance with standards established by the state board for vocational education and shall provide for not less than eight hours instruction weekly during the term for which public school is established in the district. They shall be held between 8 A. M. and 6 P. M. (2585).

Evening schools must be established whenever 10 or more persons over 16 years old in any organized school district desire instruction at evening school in the common branches, and the school board shall provide for not less than three months of such school, and not less than two hours twice each week. (2582).

When there are less than 10 persons who from any cause are unable to attend day schools, the establishment of night school by the board is optional. (2581).

(3) *Federal Standard*: Children between 16 and 18 who have not completed the eighth grade or who are not regularly employed should attend full-time school.

Code of Iowa: No provision.

(4) *Federal Standard*: Vacation schools placing special emphasis on healthful play and leisure time activities should be provided for all children.

Code of Iowa: School boards in cities of 20,000 or more may purchase or lease for educational purposes a tract of land outside the city for school garden or farm, erect suitable buildings and appoint managers in suitable manner, said tract to be maintained for the purpose of providing a summer home for city pupils desiring to continue study all year, and provide opportunity to perform productive work in vocational lines and diversify such work with open-air exercises and recreation both physical and intellectual. The purpose is to be to develop educational principles and work comprised in the term "Park Life" as exemplified experimentally and discussed educationally and sociologically in this state. The school board shall seek to correlate functions of farm and garden with regular school work in the most efficient manner. (2688).

Provision is made for state aid in 2689 and 2690.

Numerous sections on playgrounds are in force, providing for the establishment of such recreational grounds, (2681, 3734, 3729, 4087, 3735, 3736), formulation of rules and regulations, (3739), and the appointment of superintendent, and assistants, (3738), although establishment of such playgrounds is never mandatory.

3. PHYSICAL MINIMUM

(1) *Federal Standard*: A child should not work until he has been examined by a school physician or public health physician, and found of normal development for his age and physically fit for the work he contemplates.

Code of Iowa: See *Administration*, p. 12, Employment Certificates, (2), (C).

(2) *Federal Standard*: There should be annual physical examination of all working children who are under 18.

Code of Iowa: No provision.

4. HOURS OF EMPLOYMENT

(1) *Federal Standard*: No minor should be employed more than eight hours a day or 44 hours a week. The maximum working day for children between 16 and 18 should be shorter than the legal working day of adults.

Code of Iowa: Children under 16 shall not be employed more than eight hours in any one day exclusive of noon intermission, nor more than 48 hours in any one week. (886).

(2) *Federal Standard*: Hours spent at continuation schools by children under 18 should be counted as part of the working day.

Code of Iowa: If a part-time school, department, or class is established no person under 16 shall be employed more than 40 hours in any one week. (886).

(3) *Federal Standard*: Night work for minors should be prohibited between 6 P. M. and 7 A. M.

Code of Iowa: No person under 16 shall be employed in certain specified occupations (see 882), between 6 P. M. and 7 A. M. No person under 18 shall transmit, deliver, or distribute goods or messages between 10 P. M. and 5 A. M. (886).

Provision is made, in apparent conflict with the above, for issuing work badges to boys between 11 and 16 permitting them to engage in certain street occupations between the hours of 4 A. M. and 7:30 P. M., and in exceptional cases, for issuing permits to boys under 11, allowing them to work at the same occupations, and during the same hours, at hours when school is not in session. During summer vacation they are allowed to work until 8:30 P. M. (884).

5. MINIMUM WAGE

(1) *Federal Standard*: Minors at work should be paid for full time not less than the minimum essential for the necessary cost of proper living. During a period of learning they may be rated as beginners and paid accordingly, but the length of the learning period should be fixed on educational principles only.

Code of Iowa: No provision.

6. PLACEMENT AND EMPLOYMENT SUPERVISION

(1) *Federal Standard*: There should be a central agency to deal with all juvenile employment problems.

Code of Iowa: No specific provisions.

(2) *Federal Standard*: Adequate provision should be made for (a) advising children when they leave school of employment opportunities open to them, (b) for assisting them to find suitable work, and (c) supervising their first few years of employment.

Code of Iowa: (a) No Provision. (b) Provision is made for making up lists of applicants and character of employment desired, and of those desiring to employ labor, and mailing these lists to county auditors and city and town clerks who shall see that they are posted. (891-892). (c) Measures which supervise employment of minors are the act providing for factory inspectors, see p. 14, *Factory Inspection*, (1); the condition of women and children in employment, (874); the section requiring safety appliances and forbidding employment of children under certain age in dangerous occupation, (860); the section requiring reporting of all accidents, (883); the section which gives the commissioner of labor the right to enter the employer's premises at any time, and if any neglect with respect to children is evident, to give notice to the employer, and if necessary institute proceedings against him, (876, 9); and, finally, the sections governing general conditions of employment, age, work certificates, etc. (886, 888, 890), and forbidding certain occupations. (882).

7. ADMINISTRATION

a. EMPLOYMENT CERTIFICATES

(1) *Federal Standard*: Certificates required for all children entering employment under 18 years.

Code of Iowa: Certificates required for all children entering employment under 16. (884, 888).

(2) *Federal Standard*: Certificates issued only after receiving, approving and filing the following:

(a) Reliable, documentary proof of age.

(b) Evidence of completion of eighth grade.

(c) Certificate by public health or school physician stating that child has had thorough physical examination and is physically qualified to undertake the work contemplated.

(d) Promise of employment.

Code of Iowa: Certificates issued only after receiving, approving, and filing the following:

(a) Proof of age (14 or over). (888, 44, ff.).

(b) Completion of six yearly grades or equivalent. (888, 29 ff.).

(c) Certificate by public health or school physician showing that child is normally developed for his age and physically able to

perform work for which permit is sought. (888, 38 ff.).

(d) Written promise of employment and agreement to return work permit to the issuing office within two days after termination of employment. (888, 23).

(3) *Federal Standard*: Certificates to be issued to the employer and returned by him to the issuing officer when the child leaves his employment.

Code of Iowa: Work permits to be issued to the employer, (888, 66), and returned to the issuing officer within two days after the child leaves his employment. (888, 11).

(4) *Federal Standard*: The school last attended, the compulsory education department, and the continuation schools are to be kept informed by the issuing officer of certificates issued or refused and of unemployed children for whom certificates have been issued.

Code of Iowa: No provision.

(5) *Federal Standard*: Minors over 18 are to present evidence of age before being permitted to work in occupations in which the entrance ages or hours are especially regulated.

Code of Iowa: No provision.

(6) *Federal Standard*: Record forms must be standardized and the issuing of employment certificates be under state supervision.

Code of Iowa: Record forms are to be formulated by the state superintendent of public instruction, and furnished by him to the local school authorities (888, 61). Permits to be issued only by the superintendent of schools or persons authorized by him in writing, or persons authorized in writing by the local school board. (888, 15).

(7) *Federal Standard*: Reports to be made to the factory inspection department of all certificates issued or refused.

Code of Iowa: Duplicates of all work permits must be sent to the office of the commissioner of labor between the first and tenth day of the month following the month issued. (888, 58).

b. ADMINISTRATION OF COMPULSORY SCHOOL ATTENDANCE LAWS

(1) *Federal Standards*: Full-time attendance officers in proportion to school population to be provided in cities, towns, and counties.

Code of Iowa: Boards of school directors of cities of 20,000 or over to appoint one or more truant officers, to serve for one year. May be constable or member of police force. Duty to report violations of compulsory school attendance laws to secretary of school corporation and to see to enforcement. In cities and towns of second class the independent school district may employ the marshal or other police officer of such city or town to act as truant

officer and pay him, in addition to other salary, not more than \$5 per month. (2667).

(2) *Federal Standard*: Enforcement of school attendance laws by the above authorities shall be under state supervision.

Code of Iowa: Director, president of any board of directors, or any truant officers appointed by such board are to enforce the act. Penalty provided for neglecting to do so within 30 days after written notice by any citizen. (2668). County superintendent shall see that all provisions of school laws within his county, especially those relating to compulsory attendance are observed and enforced. (2504).

C. FACTORY INSPECTION AND PHYSICAL EXAMINATION OF EMPLOYED MINORS

(1) *Federal Standard*: Inspection for enforcement of all child labor laws to be under one department, and the number of inspectors sufficient to secure enforcement.

Code of Iowa: Commissioner of bureau of labor to enforce provisions of the chapter. Factory inspectors authorized by him in writing. (890).

The commissioner of the bureau of labor statistics is allowed three factory inspectors, one a woman, who under direction of the commissioner of bureau of labor statistics shall inspect sanitary and general conditions under which women and children work, make recommendations and report to the commissioner and render any other service which will tend to promote the health and general welfare of women and children employees of the state. (881).

(2) *Federal Standard*: Provision for staff of physicians to examine periodically all employed children under 18.

Code of Iowa: No provision.

SUMMARY

From the above comparisons it is evident that the Code falls short in several respects of Federal Standards as to children entering employment. The age at which children may enter employment is two years below standard in most cases, and children younger than 14 may be employed in stores or mercantile establishments employing less than eight persons, or in places of business owned or operated by their parents. Street occupations may be legally engaged in by boys of 11 years of age, or even younger, upon compliance with work permit requirements. For employment in and about mines, the Code places the age limit at 14 during summer vacation and 16 during the school year, instead of 18 in all cases as recommended by the Bureau. Instead of 21 for night messenger service, the Code sets the minimum at 16 for work during the hours of

6 P. M. and 7 A. M. and at 18 years for the hours between 10 P. M. and 5 A. M. in cities of 10,000 or over.

For dangerous and hazardous occupations, or work which would retard physical development the Iowa minimum is 16 years, instead of the suggested 21. For cleaning machinery in motion the minimum is 18 years for girls, which partially meets the requirement.

Education is compulsory in Iowa between the ages of seven and 16 instead of 18 years, and for 24 consecutive weeks or less than six months, instead of the full nine months as the Federal Bureau urges, although cities of first or second class may require attendance for the full term. The Code provides for exempting children who are over 14 and legally and regularly employed, or who have completed eighth grade, which in many cases lowers the minimum two years more.

Boards of directors in any organized school district are empowered to establish and maintain part-time schools, for minors 14 to 16 holding work permits, but are not required to do so except when there are 15 minors as defined resident in the district.

Iowa laws fulfill the standards on physical requirements with the exception of failure to provide for periodic medical examination of all working children under 18.

As to night work, the Code permits children of 11 years or younger to engage in street occupations from 4 A. M. to 7:30 and 8:30 P. M., excepting the time required for attendance at school, upon their securing work badges. Those between 16 and 18 may work until 10 P. M. and from 5 A. M. on, and there is no provision at all governing night hours of minors between 18 and 21.

There is no minimum wage regulation for minors, and no central agency dealing with all juvenile employment problems as the Federal Standards propose, unless the act providing that the state department of labor receive reports and recommendations from the woman factory inspector on the condition of women and children in industry, falls within the spirit of the requirement. Neither is there any legal provision for advising children of the opportunities and assisting them to find work, though some work is done along these lines by schools and other agencies.

The supervision of employed children is accomplished by factory inspections and similar regulations but there is no provision for individual records and systematic follow-up work that will reveal whether or not the child is suited to his occupation, or how his employment reacts upon him physically and mentally. Only one

factory inspector is provided for investigating working conditions of women and children in the entire state.

Work permits are required by the Iowa Code only up to the age of 16 years instead of 18; it requires the completion of six yearly grades instead of eight; it has no specific provision for keeping the compulsory education department and the continuation schools informed of certificates issued and refused, and of unemployed children for whom certificates have been issued; and it requires no proof of age beyond the work permit age of 16 years. Since the issuing of work permits is in the hands of school authorities the record of permits issued and refused is easily available for use by continuation school and compulsory education departments, and this lack of provision is not vital. Similarly, while the provisions for state supervision and standardization of certificates issued, and reports to the factory inspection department of all permits issued and refused are not duplicated exactly in the Code, they are approximately covered, the first by the section requiring formulation of the record forms by the state superintendent of public instruction, and issuing of permits only through school authorities, and the second by the filing of duplicate permits with the commissioner of labor. On the whole, the matter of age limit, which is too low, the school requirements, which fall two grades below standard, and the failure to require proof of being over work-permit age are the most striking discrepancies.

The one woman factory inspector under the commissioner of the bureau of labor statistics is apparently the only person particularly responsible for examining into working conditions of women and children throughout the entire state. Iowa makes no provision for periodical examination of working children.

The Code makes no provision for full-time truancy officers, but merely specifies that the marshal, constable, or other police officer may be appointed, and the number of such persons appointed is left entirely to the discretion of the city or town concerned. The enforcement of attendance laws is left to the county superintendent, the director or president of any board of directors, or any truant officer, and county instead of state regulation is provided.

III. STANDARDS FOR THE PUBLIC PROTECTION OF THE HEALTH OF CHILDREN AND MOTHERS

8. MATERNITY

(1) *Federal Standards*: There should be maternal or prenatal centres, whose work should include complete physical examination, instruction in hygiene and supervision through pregnancy, employment of public health nurses for home visiting and instruction, properly attended confinement, and examination by physician before discharge of patient. (For complete requirements see Standards, pp. 7-8). Activity under these heads has been started under authority of the Federal Sheppard-Towner Act.

Code of Iowa: See *Infants and Preschool Children*, (4), p. 19, for provisions on public health nurses.

(2) *Federal Standard*: Clinics, such as dental and venereal, for needed treatment during pregnancy, should be established.

Code of Iowa: It is provided that free hospital service and medical and surgical treatment may be had at the state university hospital for any person over 16 afflicted with a malady or deformity which can probably be remedied by such treatment, and who is unable to pay for the same. (2386-2394).

Provision is also made for county hospitals, the board of trustees of which are to determine what patients are subjects for free treatment. (3309, 3326).

The board of supervisors in any county having no county hospital may establish one or more wards in any public or private hospital for the use of the county, and levy a tax for the maintenance of the same. (Laws Thirty-ninth G. A., p. 76, Ch. 83, Sec. 1-2).

The last legislature appropriated \$25,000 annually for a Bureau of Venereal Disease, part of which is expended for clinics.

(3) *Federal Standard*: Maternity hospitals or wards for all desiring or needing hospital care, and free or part-payment for every necessitous case.

Code of Iowa: Provision for licensing and supervision of maternity hospitals is made, (1357, 1361), but no statement made as to free or part-payment service, though this is partially covered by provisions for free hospital service at the University hospital, and at county hospitals.

(4) *Federal Standard*: All midwives required by law to be licensed and supervised, and to show adequate training.

Code of Iowa: Physicians or midwives may obtain a certificate from the board of medical examiners permitting them to practice medicine, surgery, or obstetrics without a diploma from a medical school, or examination by the board. (1311). No legal provision is made for supervision and training.

(5) *Federal Standard*: Adequate income to allow the mother to remain in the home during the nursing period.

Code of Iowa: See p. 31 of this study.

(6) *Federal Standard:* Education of the public in problems of maternal and infant mortality and their solution.

Code of Iowa: Taken care of under the Sheppard-Towner Act, through Federal co-operation with the state.

9. INFANTS AND PRESCHOOL CHILDREN

(1) *Federal Standards:* Complete birth registration by legislation requiring reporting within three days after birth.

Code of Iowa: Provision is made for reporting births in maternity hospitals within 24 hours (1359), and for filing other certificates of birth with the clerk of the district court in the county within 10 days, (1369). The new vital statistics law, adopted by the Thirty-ninth General Assembly makes Iowa eligible for admission to the registration area of the United States.

There is provision under penalty for collection and report of vital facts by properly appointed local registrars, and for establishment of a Bureau of Vital Statistics at the state capitol. Reporting of births must be by physician, midwife, or other person acting in the capacity of midwife, or if none such attend, then by the father or mother or householder or owner of the premises, and manager or superintendent of the institution where the birth occurs. The act elsewhere provides for state-wide registration of physicians, midwives, undertakers, and casket-makers. Stillbirths are to be registered as both births and deaths and the certificates filed with the local registrar in the usual form and manner. The medical certificate must show cause of the stillbirth if known and midwives are forbidden to sign a certificate for stillborn children.

The law provides that the full name of the father shall be given in recording a birth, but in the case of an illegitimate child it may not be entered without his consent, though other facts relating to his age, color, occupation, etc., may be given if known. (Laws, Thirty-ninth G. A., Chs. 222, 229).¹

(2) *Federal Standard:* Prevention of infantile blindness by requiring treatment at birth, and supervision of all positive cases.

Code of Iowa: An act passed by the Thirty-ninth General Assembly requires that physicians treat at birth the eyes of all infants except those whose parents hold membership in a church which objects to the principles of medical treatment.²

(3) *Federal Standard:* Children's health centre, including nutrition clinics, to give health instruction, throughout preschool age. (See Standards, p. 8, for details.).

Code of Iowa: No provision.

¹Reuter, E. B., Vital Statistics, Iowa Law Bul. VII, No. 1, pp. 43-46.

²From mimeographed statement of the Iowa State Conf. Social Work.

(4) *Federal Standard*: Children's health centre should provide, or co-operate with, public health nurses, one for average population of 2,000, to make home visits to all preschool children and instruct mothers. (See Standards, p. 8, for details of instruction).

Code of Iowa: Boards of supervisors, city and town councils, school boards, and judges of juvenile courts have power to employ public health or visiting nurses, at such periods in the year and in such numbers as they deem advisable, and prescribe their duties, which shall in a general way be for the promotion and conservation of public health. (1335, 1336, 1337, 2094).

(5) *Federal Standard*: Clinics, (dental, eye, ear, nose, and throat, venereal and other clinics) for the treatment of defect and disease.

Code of Iowa: Dental clinics: See p. 22, School Children 7.

Venereal disease: Provision for payment by county from county poor fund for treatment of persons unable to pay for same. (1294).

Other diseases: Provisions for free medical and surgical treatment of indigent children at the University hospital at Iowa City. (Chapter 9). This includes all remedial difficulties, since the school nurse or any person interested may recommend any indigent child that will apparently be benefited by treatment, and after due investigation, such child will be received at the hospital.

(6) *Federal Standard*: Children's hospitals, or beds in general hospitals, or provision for medical care at the University hospital for all indigent children under 16 who will apparently be benefited by such treatment. (Chapter 9, 2375 ff.) Provisions for persons over 16 (2386-2394).

(7) *Federal Standard*: State licensing and supervision of all child-caring institutions.

Code of Iowa: Provision for supervision by board of control of state institutions of all private associations or societies receiving children, such institutions to be subject to visitation by the board members or agents, who may require such information and statistics as the board may deem necessary in order to exercise proper supervision and control. Annual reports required. (2139).

"The board of control shall designate and approve the institutions and associations to have charge of juveniles under this chapter, (Neglected, Dependent, and Delinquent Children) and shall have supervision, oversight and right of visitation (by all or any of its members or by such persons as it shall appoint thereto) in all institutions and associations having charge of juveniles under this chapter, and said court, institutions and associations shall make annual reports in the first 15 days in January of each year to said board of control." (2112).

(8) *Federal Standard*: General educational work in prevention of communicable diseases in hygiene and feeding of infants and

young children, including compulsory courses in child hygiene in the public schools.

Code of Iowa: Regular courses in physiology and hygiene in public school are required (2555). An appropriation of \$20,000 annually is made for a chair of Preventive Medicine and Hygiene at the University.

10. SCHOOL CHILDREN

(1) *Federal Standard:* Proper location, construction, hygiene and sanitation of school buildings; no over-crowding.

Code of Iowa: Regulations covering construction of doors, (1065), fire escapes, (1062, 1063, 1064), plans and specifications for buildings, prepared by the superintendent of public instruction, assisted by the state architect, (2267, 2269), school house sites, (2640), and sanitary investigation, (1266, 2569), are to be found, which cover the requirements with the exception of adequate room space.

(2) *Federal Standard:* Adequate playground and recreational facilities, physical training and supervised recreation.

Code of Iowa: Playground and recreational facilities: School boards in cities of first or second class, or under commission plan of government are authorized to establish and maintain for children in public school buildings and on public school grounds, under custody and management of the boards, public recreation places, and playgrounds and necessary accommodations for the same without charge to the residents of said school district. (2681).

All cities having a population of 50,000 or over are empowered to provide for the several districts or for any one district, community centre houses, with recreation grounds adjacent for the use, recreation, and instruction of the residents of said districts. (3720).

The city councils are also empowered to divide the city into community centre districts and to determine and define the boundaries of such districts, with regard to existing natural community centres and the probable growth thereof in the future growth of the city, the intention being to provide for such outlying districts within the city as by reason of distance, means of communication, or other causes, have or are likely to develop a distinct community life, a community centre house and grounds, for recreation, community meetings, instruction, and entertainment, and for general betterment and development of the life of the district affected. (3721).

The city council shall require suggestions for rules and regulations to be adopted for government and operation of such community centre improvement from the community centre board and superintendent, and from public spirited citizens who are interested in such development, and particularly in the child welfare of such city. (3728).

Provision for condemnation and purchase of land, (3736); issuing playground bonds, (3735); levy of tax, (3737); provision for transfer of public squares of grounds for use as playgrounds, (4087); manner of transfer, (4088).

All cities have the power to provide one or more playgrounds as herein provided, number and location to be determined by the city council, provided that the electors of that city vote in favor of establishing such playground. (3734).

City councils may certify to county auditors and cause to be collected a special tax for the construction of such swimming pools, bathing beaches, bathhouses, ice rinks, dance pavilions, shelter houses, wading pools and river walls as are authorized in cities of 50,000 in, and in connection with the parks. (4270, 4271).

River front commissions may construct and regulate the use of bath-houses, boathouses, and other suitable structures and have exclusive jurisdiction over the water of such streams, and may maintain them in suitable condition for boating, skating, and other public amusements and purposes. (3715).

Cities and towns have also the power to regulate, define, tax, license or prohibit public dance halls, skating rinks. (3600).

Physical training and supervised recreation: School boards are empowered to co-operate with commissioners or boards in charge of public buildings, parks and grounds, and provide for supervision, instruction, and oversight necessary to carry on public educational and recreational activities. (2681).

Provision for playground rules and regulations are to be formulated by playground superintendent, superintendent of schools, and public-spirited citizens. (3739).

Provision for appointing superintendent of playgrounds, who shall be in charge of playgrounds, and have control over children playing thereon, and have other powers and duties fixed by the city council. Additional help to be employed if necessary. (3738).

Provision for maintenance of playgrounds in connection with community centre activities, and for supervision, instruction and oversight necessary to carry on public educational and recreational activities. The city council to arrange as it seems best with the school board for necessary personal supervision. (3729).

Provision for community civic congress of three persons especially fitted for and interested in community work, who may co-operate with city council in all matters pertaining to child welfare, and social and recreational activities, as contemplated in this section. (Juvenile Playgrounds) (3640).

(3) *Federal Standard*: Open-air classes and rest periods for pre-tubercular and malnutrition cases.

(4) *Federal Standard*: Full-time school nurse for not more than 1,000 children to instruct children, take them to clinics, and make home visits. (See Standards, p. 438, for details of duties).

(5) *Federal Standard*: Space and equipment for school medical work, and laboratory service.

Code of Iowa: No provision under (3), (4), or (5).

(6) *Federal Standard*: Part-time physician and one full-time nurse for 2,000 or full-time physician with two full-time nurses for 4,000 children for:

(a) Complete standardized physical examination once a year, and monthly weighing wherever possible.

(b) Continuous health record for each child to be kept on file.

(c) Special examination of children referred by teacher or nurse.

(d) Supervision to control communicable disease.

(e) Recommendation of treatment for all remediable defects, diseases, deformities, and cases of malnutrition.

(f) Follow-up work by nurse to see that physician's recommendations are carried out.

Code of Iowa: No provision for school nurses and physicians, although many municipalities provide for their own, and frequently the city health nurses are called upon to perform these duties.

(a), (b), (f). No provision.

(c), (e). Provision for examination of any child referred by any reliable person, who is afflicted with some deformity or suffering from some malady that can probably be remedied, and commitment, with consent of parents, to the hospital at the State University of Iowa for treatment. (Chapter 9).

(d). Physicians, parents, guardians or school teachers are to report cases of whooping cough, measles, mumps or chicken pox to the local board of health, and houses of children afflicted must bear placards as public warning. (1276-1277).

(7) *Federal Standard*: Available clinics for dentistry, eye, ear, nose and throat, skin diseases, orthopedies, and free vaccination for small pox, and typhoid.

Code of Iowa: Dentistry: School boards in districts of 1,000 or over may establish school dental clinics and offer courses in mouth hygiene, and are now empowered to employ such dentists and hygienists as may be necessary to accomplish their purpose. (2556).

Orthopedies: Provision for free medical and surgical treatment at the hospital at the University of Iowa for children whose parents cannot afford such service. (2375-2385).

This chapter covers practically all remediable defects.

Free vaccination: No provision.

(8) *Federal Standard*: Nutrition classes for physically sub-normal children and hot lunches when necessary.

Code of Iowa: No provision.

(9) *Federal Standard*: Examination by psychiatrist of all atypical or retarded children.

Code of Iowa: Provision is made for petition to adjudicate feeble-mindedness, (1953), examination by qualified physician or psychologist, (1956), and hearing by court and commission appointed consisting of two qualified physicians and a qualified psychologist, (1957).

(10) *Federal Standard*: Education of school child in health essentials.

Code of Iowa: School laws to be enforced, "especially the provisions relating to the teaching of such divisions of physiology and hygiene as relate to the effects of alcohol, stimulants and narcotics upon the human system." (2504).

All pupils are required to receive and all teachers to give instruction in physiology and hygiene, including the effect upon the human system of alcoholic stimulants, narcotics, and poisonous substances. The instruction in this branch shall of its kind be as direct and specific as that given in other essential branches, and the pupil required to complete that part of such study in his class before being advanced to the next. (2555).

School boards may establish dental clinics in certain cases, and have offered courses in mouth hygiene. (2556).

(11) *Federal Standard*: General educational work in health and hygiene including education of parent and teacher, to secure full co-operation in health program.

Code of Iowa: The only sections of the Code which might apply are those on instruction in physiology and hygiene. (2504, 2555, 2556).

11. ADOLESCENT CHILDREN

(1) *Federal Standard*: Complete standardized physical examination, including height and weight, by physician at least once a year, and recommendations for necessary treatment to be given at children's health centre.

Code of Iowa: No provision.

(2) *Federal Standard*: Clinics for treatment of defect and disease.

Code of Iowa: Provision for treatment of all children suffering from remediable defects. (Chapter 9). Dental clinics authorized. (2556).

See also p. 17 of this study, Maternity (3), for county hospitals and free wards.

(3) *Federal Standard*: Supervision and instruction to insure:

- (a) Ample and growth-producing diet.
- (b) Sufficient rest and fresh air.
- (c) Adequate and suitable clothing.
- (d) Proper exercise for physical development.

(e) Knowledge of sex hygiene and reproduction.

Code of Iowa: These provisions are not covered in the Code.

(4) *Federal Standard:* Full-time compulsory education to at least 16 years, adapted to adolescent needs and interests, with vocational guidance and training.

Code of Iowa: For compulsory education see pp. 9 to 10 of this report. Educational Minimum.

Vocational Guidance and Training: In section 2279 the provisions of the Federal Smith-Hughes Act are accepted, and in the following sections the duties of the state board of education are defined in full, (2283), standards established and inspection provided for, (2284), approved schools, departments or classes defined, as well as approved teachers, training schools, departments or classes, (2285), duties and organization of local communities are explained, (2287, 2288), appropriation is made, (2292), establishment of normal courses provided for in certain high schools, (2309), and in private and denominational schools, (2310), state aid offered, (2311), and conditions of admission, examination, and registration of certificates specified, (2313, 2314, 2315). An appropriation of \$150,000 annually is made. (2317).

(5) *Federal Standard:* Clean, ample recreational opportunities to meet the social needs.

Code of Iowa: In its details this requirement can only be handled locally, though it is possibly covered to some extent by the playground and community centre regulations. (See School Children).

(6) *Federal Standard:* Legal protection from exploitation, vice, drug habit, etc.

Code of Iowa: Exploitation: Pawnbrokers and second-hand dealers or junk dealers may be prohibited from receiving or purchasing from minors any property without the written consent of their parents or guardians, and provision is made for the examination of premises for the purpose of discovering stolen property. (3602).

All guardians are required to render an account to the district court at least once each year of all property belonging to their wards. (6658).

Provision is made for watching of minors' interests when such minor is apprenticed. (6700), for complaint when a master ill-treats his apprentice, or in any manner fails to discharge his duty in regard to him, (6701), and for judgment and discharge of minor from further service if justified. (6703).

Provision is made for punishing parents who permit children to engage in street occupations in violation of the provisions of the Code. (884).

Provision is also made for punishment of any persons having control of any child under 16 who cause or permit said child to

work or be employed in violation of the provisions of the Code, or any person certifying to false statements to secure the employment of such child, or concealing violation of such provisions, or any person, firm, or corporation, or its representatives, who knowingly employ any person in violation of the law, or refuse to allow authorized inspection as provided, or fail to keep posted the lists of persons employed under 16. (889).

Penalty is provided for enticing or taking away any female child for the purpose of prostitution. (8801).

Vice: Provision is made for the punishment of any person who inveigles or entices to a house of ill fame any female before reputed virtuous, or who shall aid in concealing such female, (8800), or who shall take or entice away any female child under 18 for the purpose of prostitution. (8801).

The section providing punishment for rape places the age of consent at 15 years, but the Thirty-ninth General Assembly has raised this age to 16 years in cases where the man involved is under twenty-five, and to 17 in other instances.¹

Other protective measures are those which punish immoral acts with children, (8803), forbid immoral plays, exhibitions and entertainments, (8804), or obscene productions by phonograph, (8815), or the giving or showing of obscene literature to minors. (8812).

Minors are also forbidden to remain in billiard halls, beer saloons, nine or ten-pin alleys, or to take part in any of the games known as billiards or nine or ten-pins. (8828).

Police matrons are provided for, (3523, 3538), to have charge of all women and children under arrest, and if necessary to accompany them to court, and appropriation is made for arranging separate care and confinement in station houses of all women and children under arrest, and appointment, salary and maintenance of police matrons. (3541).

See also p. 38 of this study, *Juvenile Court*, for provision for separate care and confinement of children under arrest.

Drug Habits: Very detailed provision is made preventing the use of tobacco by minors. School boards are to prohibit its use in any form by any student and those who violate the order are liable to suspension or expulsion. (2549).

The use of tobacco in any public place by any person under 21 is forbidden, except when in company of parent or guardian, (8879), and penalty is provided for any person found violating the provisions of the preceding section, (8880). Tobacco in any form must not be sold to any minor under 16 except on written order of parent or guardian, (8866), and the sale of cigarette papers and cigarettes is also forbidden if with the intent to violate any provision of this section or authorize or permit the same to be done. (8867).

¹From mimeographed statement of the Iowa State Conf. Social Work.

Objectionable advertisements, such as bills, posters, or other matter used to advertise sales of intoxicating liquors or tobacco are not to be distributed, posted, painted or maintained within 400 feet of the premises occupied by public school buildings, or used for school purposes. (8881).

The sale or gift of liquor, except upon written order of parent or physician is forbidden, and penalty provided for violation, (963, 964). It is also forbidden to bring liquor or drugs, ("opium, morphine, cocaine, or other narcotic, or any intoxicating liquor") to inmates of training schools, institutions for feeble-minded or onto the grounds thereof, or into any place in connection with such institution. (1970).

The child is protected from the consequences of such habits by the provision for civil action for damages against any person who shall give or sell to another, contrary to the provision of this chapter, any intoxicating liquors which result in injury of the child's person or property by an intoxicated person, and exemplary damages may be collected as well. (979).

Other protective measures not falling under any of these heads should be mentioned. They are, in brief: the section which forbids the selling or giving of firearms to minors, (8597), though in this connection it is interesting to note that provision is made for issuing hunting licenses to persons over 18, and to persons under that age if they have the written consent of parent or guardian, (1141); the prohibition of displays of weapons, excepting war relics, in any window facing a public street or alley, (8596); the prohibition of sale of toy pistols, toy revolvers, dynamite caps, (except for use in mines or for signaling), blank cartridges, or fire-crackers more than five inches long, and three-fourths of an inch in diameter, (8598); the section restraining any person under 15 from driving a car unless accompanied by a person of mature years, even when the consent of the owner is given, and making the owner liable for any damages that may result from negligence of such driver, (2055); the provision for placing a feeble-minded child under guardianship, or detaining such child in a place of safety pending preparation, filing and hearing of petition, (1970); and the section which punishes child-stealing, (8623). The ages at which children may marry are so low as to carry no protective significance. When consent of the parents is obtained, a boy of 16 and a girl of 14 may be legally married. (6588, 6589).

SUMMARY

The Federal Standards are frequently somewhat elusive, and it is not possible to check point for point such general statements as "proper location, hygiene and sanitation of school buildings," and "adequate playground facilities." Iowa has, however, rather comprehensive provisions covering both of these items. There is

no provision in the Code for open-air classes and rest periods for pre-tubercular and malnutrition cases, and no definite statement as to the numbers of public health nurses to be employed. No provision is made for laboratory service and space and equipment for school medical work, or for school physicians, although a few of their proposed duties are taken care of in other ways, as in the case of children who are recommended for treatment at the University Hospital at Iowa City. Standardized physical examinations, continuous health records, and follow-up work by nurses after recommendation by physicians, are not specifically provided for, though they are largely taken care of by teachers and nurses. Free vaccination for small pox and typhoid is not provided for, and examination by psychiatrist of all atypical and retarded children is not required. Provision is made for this examination only when a petition is filed to adjudicate feeble-mindedness, so that none but the worst cases receive reliable diagnosis unless the parents take the initiative. The Federal Children's Bureau Standards on nutrition classes, education of children in health essentials, and general educational work among parents and teachers are not so well adapted to regulation by state law as to local solution, though the Code makes some provision for instruction in physiology and hygiene.

The Federal Standards on maternity regulations are very comprehensive and many of their details seem to be matters for county and municipal, rather than state action. The Code does not cover these matters. Activity under the Sheppard-Towner act was instituted by authority of the governor since the last legislature.

The employment of public health nurses is optional, as is the number of such nurses to be employed. Licensing and supervision of maternity homes is required though no statement is made as to incorporation. Midwives are registered and licensed.

Clinics for treatment during pregnancy and free or part payment hospitals for needy cases are furnished at least in part by provision for free wards in county hospitals and for treatment of indigent persons over 16 at the University Hospital at Iowa City.

In the care of infants and preschool children, then, Iowa comes very close to the Standards in those provisions definitely subject to state legislation, except that nothing is said as to the number of public health nurses to be employed. Children's health centres are better regulated locally, because of various details of administration.

There is no very marked discrepancy between the Iowa Code and the Federal Standards as to adolescent children, save that Iowa makes no provision for regular standardized physical examinations, and the school attendance requirements are not entirely adequate. (See summary of statutes relating to children entering employment, p. 15).

Vocational training and recreational opportunities are rather fully taken care of in the Code, and there are numerous acts intended to protect children from exploitation, vice, drug habits, etc. The Federal Standards are not explicit on these points and it is impossible to make a detailed comparison.

IV. CHILDREN IN NEED OF SPECIAL CARE

12. *Federal Bureau Standards* emphasize the desirability of normal home life, so far as possible, for every child. Part of the general statement is as follows:

"Aside from the general fundamental duty of the State toward children in normal social conditions, ultimate responsibility for children who, on account of improper home conditions, physical handicaps or delinquency, are in need of special care, devolves upon the state. Particular legislation is required for children in need of such care, the aim of which should be the nearest approach to normal development. Laws enacted by the several states for these purposes should be co-ordinated as far as practicable in view of conditions in the several states, and in line with national ideals."

Code of Iowa: Improper Home Conditions and Delinquency.

Sections of the Code which recognize this state responsibility are the following:

Provisions for investigating all juvenile court cases to find whether the person responsible for the care, custody, maintenance, education, medical treatment and discipline of the child or children involved is doing his full duty by such child or children and in case the court finds that the parents or other persons in loco parentis are not doing their duties, the court shall try all lawful and proper means, under the chapter, to make them do so, giving them aid and assistance in case it be deemed necessary. (2128).

Provision for admission to Soldiers' Orphans' Homes of all destitute children of soldiers, sailors and marines, residents of Iowa, orphans of soldiers, under 15 years of age, destitute or unable to care for themselves, and such other destitute children of like age who have legal settlement in the state, and whose applications for admission are approved by the board of supervisors or judge of court of record. (2449).

Provision for tax of not over one-half mill on the dollar in any

one year on all taxable property in the county to aid in and for the maintenance of destitute orphans. (4625).

Provision for punishing any father or mother who shall abandon a child under six years of age, or any person to whom such child has been entrusted or confided. (8851).

Another section defines desertion as without good cause abandoning any child or children under the age of 16, leaving such child or children in destitute condition, or without good cause wilfully neglecting or refusing to provide for them, they being in a destitute condition, and penalty is provided for such neglect. (8845).

A child who, after two years is declared abandoned by both parents, is taken in charge by the State, and the court may order the clerk of the district court to sign papers for its adoption, or it may be turned over to some home finding association approved by the State Board of Control, or the Soldiers' Orphans' Home at Davenport. (2126).

Any person guilty of contributory dependency must fully comply with court orders for a period of two years after judgment, or in case of failure the court may declare the child or children abandoned. (2125).

The Thirty-ninth General Assembly has passed a bill providing for trial in the juvenile and justice courts as well as in the district and superior courts of persons charged with contributing to the delinquency of children, and it is also possible to prosecute for any indictable misdemeanor or felony that contributed to the delinquency of a child, as well as for contributory delinquency.¹

Provision is made for committing neglected, dependent, destitute or delinquent children to the Juvenile Home, unless it shall appear to the court best to make other lawful provision. (2462). Provision is also made for committing to the Training Schools when the child is seriously delinquent, (2150, 2156), and for removal of any children who may prove unruly or incorrigible, or whose presence is manifestly and constantly detrimental and dangerous to the school, and proceedings may be resumed as though no committal had been made. (2157).

Counties are liable for sums paid by the Soldiers' Orphans' Home for support of children not soldiers' orphans, these sums to be collected as part of the taxes due the State. (2458).

Children received by the Juvenile Home become wards of the State, (2467), and if not furnished the care, education, treatment and maintenance required by the agreement, when placed out by adoption, may be taken by the Board of Control and other disposition made to their best interests. (2466).

Parents or other persons not party to placing children by adoption or for a term of years shall not interfere in any manner with the child or children, or assume control over their earnings. (2464).

¹From mimeographed statement of the Iowa State Conf. Social Work.

The State provides care at Glenwood for feeble-minded and idiotic children, (1939, 1940), and upon admission they become wards of the state. (1949).

Permanent custodial homes are not required for blind and deaf children, but their education at the School for the Blind at Vinton, and at the Iowa School for the Deaf at Council Bluffs, is made compulsory up to the age of 19, (2675, 2678, 2680), and provision is made for the admission of persons over that age, with the consent of the State Board of Education. (2443).

13. HOME CARE

Federal Standard: The aim of all provisions for children who must be removed from their own homes should be to secure for each home life as nearly normal as possible, safeguard health, and provide for education, recreation, vocational preparation, and moral and spiritual development. Family homes should be used more.

Code of Iowa Sections seeming to fall within the spirit of this requirement are the following:

The Board of Control shall cause the boys and girls in the Training Schools to be instructed in piety and morality, and such branches of useful knowledge as are adapted to their age and capacity, and in some regular course of labor, either mechanical, agricultural, or manufactural as is best suited to their age, strength, disposition and capacity, and promises best to secure the reformation and future well-being of the pupils. Instruction shall also be given in physiology and hygiene, with special reference to the effects of alcoholic drinks, stimulants and narcotics upon the human system. (2152).

At the Juvenile Home provision is made for teaching common school branches, and the higher branches, science and arts, so far as practicable, and such manual training as shall best physically and otherwise develop and fit such inmates to become good citizens and obtain for themselves a livelihood upon discharge. (2461).

At the Iowa Soldiers' Orphans' Home, provision is made for common school education, and regular employment in some useful pursuit, and after discharge the Board of Control and the superintendent shall assist them to find homes and employment. The children are also to be instructed in physiology and hygiene as taught in the common schools. Any profit from the labor at the Home shall be placed at interest in a bank and each inmate paid, when discharged, in proportion to the amount his or her labor contributed. (2542).

Section 2113 contains the following statement: "This chapter shall be liberally construed to the end that its purpose may be carried out, to-wit: that the care, custody, and discipline of a child shall approximate as nearly as may be, that which should be given by its parents, and in all cases when it can properly be done, the

child is to be placed in an approved family home and become a member of the family by legal adoption or otherwise."

14. ADEQUATE INCOME

Federal Standard: An adequate income for each family. Assistance to mothers who are competent to care for their own children should be sufficient to enable the mother to maintain her children suitably in her own home. (See Standards p. 11).

Code of Iowa: Section 816 on Workman's Compensation provides that if death results from injury the employer shall pay dependents of the employee wholly dependent on his earnings for support at the time of injury, a weekly payment equal to 60 per cent of his average weekly wages, but not more than \$15 nor less than \$6 per week for a period of 300 weeks from the date of injury. (816, 30d).

If the employee leaves dependents only partially dependent upon his earnings for support at the time of injury, weekly compensation shall be paid equal to the same proportion of weekly payment for the benefit of persons wholly dependent as the amount contributed by the employee to such partial dependents bears to annual earnings of the deceased at the time of injury. When weekly payments are made to the injured employee before his death, compensation to dependents shall begin from the date of the last of such payments, but shall not continue more than 300 weeks from the date of injury. (816, 30e).

Provision is also made for appointment of trustees for minors and those physically and mentally incapacitated, and for payment to this trustee of money to be used for the benefit of such person under the direction of the judge during term time or in vacation. The trustee is required to make annual reports. (820).

Provision is made for relief by trustees and overseers of the poor of such poor persons as in their opinion should not be sent to the county home. Relief may be food, clothing, rent, fuel and lights, medical attendance, or in money, and shall not exceed two dollars per week for each person for whom relief is thus furnished, exclusive of medical attendance. (3289).

Families of soldiers and sailors are not to be sent to the county home when they can, and prefer to be, relieved to the extent provided in 3289, (3290), and a fund is created for the relief of such soldiers and sailors and their families, though relief does not include allowance for boys over 14 or girls over 16 years of age. (3342).

The Widows' Pension law is a direct effort to keep children at home by providing financial aid for the mother. If the court shall find the mother of any dependent or neglected child is a widow, and poor and unable to care for such child, but otherwise a proper guardian, and that it is for the welfare of the child to remain at home, the court may enter an order finding such fact, and fixing

the amount of money necessary to enable the mother to properly care for such child. It is made the duty of the overseer of the poor or other person to pay to the mother the amount specified, providing that the amount to be paid for the care of any such child shall not exceed two dollars per week; and provided further that such payment shall cease upon the child's attaining the age of 16 years; and provided further that at any time after such allowance is made, the overseer of the poor or board of supervisors may make objection to the continuance of such allowance. (2104).

The Thirty-ninth General Assembly amended this act increasing the maximum per child from two to three dollars per week.

Under this law any mother whose husband is an inmate of any institution under the care of the Board of Control shall be considered a widow, but only while her husband is so confined. (2105).

15. INCORPORATION, LICENSING, AND SUPERVISION OF CHILDREN'S AGENCIES

Federal Standard: A State Board of Charities or similar supervisory body should be held responsible for the regular inspection and licensing of every institution, agency or association, public or private, incorporated or otherwise, that receives or cares for children who are suffering from physical handicaps, or who are delinquent, dependent, or without suitable parental care. The incorporation of such institutions, agencies and associations should be required, and should be subject to the approval of the State Board of Charities or similar body.

Code of Iowa: The Board of Control of State Institutions must designate and approve institutions to have charge of juveniles under this chapter (Neglected and Delinquent Children) and must supervise, oversee and visit all institutions and associations having charge of such juveniles, and make annual reports in the first 15 days of January of each year. (2112).

Other institutions under the supervision and control of the State Board of Control are the Soldiers' Orphans' Home, the Training School, in both departments, the state penitentiary, men's reformatory, the Juvenile Home, the Soldiers' Home, State Hospital for the Insane, Institution for the Feeble-minded. (1859, 2471).

All associations or societies receiving children under this chapter. (Institutions for Delinquent Persons) shall be under the supervision of the board of control of state institutions and shall be subject to visitation by the board or its agents, which may require such information and statistics from such associations as the Board shall deem necessary, in order to enable them to exercise proper supervision over them. Every such association shall file with the State Board of Control during January of each year, an annual written or printed report, which shall include certain specified statements. And no children shall be committed to the care of any such asso-

ciation which shall not have filed a satisfactory report for the calendar year last preceding. (2139).

Instructions as to what to inspect are given, (1904), and provision made for investigating charges of abuse, neglect, or other misconduct made against the management of any officer or employee of any county or private institution. (1905).

16. REMOVAL OF CHILDREN FROM THEIR HOMES

Federal Standard: No child should be removed from his home unless it is impossible so to reconstruct family conditions or build and supplement family resources as to make the home safe for the child, or so to supervise the child as to make his continued presence safe for the community.

Code of Iowa: In the case of a dependent, neglected, or delinquent child, the court may continue hearing from time to time and may commit the child to the care or custody of a probation officer, and may allow said child to remain in its own home subject to visitation of the probation officer, such child to report to the probation officer as often as may be required. (2103).

When children are allowed to remain in custody of persons guilty of contributory dependency, the court may prescribe such conditions as seem most calculated to remove the cause of such dependency and neglect, and in case the court deems it for the best interests of the child to remove it from the home until conditions of probation have been complied with, and the court is satisfied that compliance will continue, then the court may place the child in care of the juvenile detention home, wherever such is authorized, or of such other suitable institution provided for by the juvenile court to act for such time during minority as the court may deem fit. (2124).

Dependent, neglected and delinquent children are defined in section 2089. Under those terms are included children whose homes, by reason of cruelty or depravity on the part of the parents or guardians or other persons in whose care they may be, are unfit places for such children.

Effort is made to preserve family life for the child by requiring parents of any dependent, neglected or delinquent child, if the court finds them able to do so, to support such child, and provision is further made for enforcing this order. (2107).

The interests of the child are emphasized further in the section which provides that the chapter shall be liberally construed in favor of the state for the purpose of protecting the child from neglect, or omission of parental duty toward the child by its parents, or other persons in loco parentis, and further to protect the child from the effects of improper conduct or the acts of any person which may cause, encourage or contribute to dependency and neglect of such child, although such person is in no way related to such child. (2129).

Detention homes and school are to be provided and maintained in counties having a population of over 40,000, and must be separate, apart, and outside of any jail or police station. These detention homes and schools are to be used for dependent, neglected, and delinquent children. (2110).

When contributory dependency consists in failure of such person to work, when physically and mentally able to do so, provision is made for finding employment for him, and requiring him to work. It is further explained that while this statute shall not be interpreted as allowing involuntary servitude, it shall be liberally construed as punishing the party affected for contempt, in case he does not do his parental duty and support his children as the law contemplates that he should do, after he has been ordered by the court to do so and efforts have been made to aid him in so doing. (2120).

Persons guilty of contributory dependency must fully comply with court orders for a period of two years after judgment, or, in case of failure, the court may declare the child or children abandoned. In case both parents are living and neither are relieved of duty, and both are guilty of contributory dependency, both shall be proceeded against at the same time. (2125).

17. PRINCIPLES GOVERNING CHILD PLACING

Federal Standard: (a) Adequate consideration of health, mentality, character and family history and circumstances, and correction of remediable physical defects before placing child in permanent foster home.

(b) Complete records of every child under care, in order to understand the child's heredity, development, and progress while under care of the agency.

Code of Iowa: (a) and (b) No provisions; administrative rather than legislative problems.

Federal Standard: (c) Careful and wise investigation of foster homes as prerequisite to the placing of children. Adequate standards required of the foster homes as to character, intelligence, experience, training, ability, income and environment.

Code of Iowa: Any person competent to make a will is authorized to adopt as his own the minor child of another, conferring thereby upon it all the rights, privileges, and responsibilities which would pertain to it if born in lawful wedlock to the person adopting it. (6685, 6686).

It is also provided that any child, with the consent in writing of parents or parent may be adopted by any citizen of this state on the recommendation of the superintendent with the approval of the Board of Control of State Institutions. Articles of adoption must be signed and recorded. This ruling applies to both the Soldiers' Orphans' Home and the Juvenile Home. (2453, 2465).

Children may also be placed out from these various institutions

by the superintendent by contract with any person or family of good standing and character, where they will be cared for and educated properly. (2454).

Children placed out by contract from the training schools may be placed by the superintendent, with the approval in writing of the Board of Control, with any persons or in any family of good standing and character where they will be properly cared for and educated. They shall be so placed under articles of agreement to be signed by the person or persons taking them, and the superintendent, approved by said Board of Control, which shall provide for their custody, care, education, maintenance, and earnings for a time to be fixed in said articles, which shall not extend beyond the time when a boy or girl so placed be not given the care, education, treatment and maintenance required by such agreement. The Board of Control may cause the boy or girl to be taken from the person or persons with whom placed, and returned to the institution, or may replace, release, or finally discharge him or her as may see best. (2155).

Any association or individual awarded the guardianship of a child may place the child in a family home, with or without indenture, and may be party to any proceedings for the legal adoption of the child, and the assent of the guardian shall be sufficient to authorize the court to enter the proper order or decree for adoption. (2108).

State Agents are now provided for the Soldiers' Orphans' Home, the training schools, and the women's reformatory, whose duty it is to find suitable homes, positions, and employment when desirable, for the inmates of these institutions, to inspect the homes of such persons, exercise supervision over them, and when the environment or associations are bad, to require them to obtain other homes or places of employment. (1914).

In case of maltreatment, committed or allowed by the adopting parent, or neglect of duty on his part toward the child, the custody thereof may be taken from him by the district court of the county where the parent resides, and intrusted to another at his expense, but no action of the court shall affect the acquired right of inheritance of the child. (6689).

Children adopted and furnished the care, education, treatment and maintenance required by the agreement, may be taken by the Board of Control and other disposition made to their best interests. (2467).

Federal Standards: (d) Complete records should be kept of each foster home, giving information on which approval is based, showing the agency's contact with the family from time to time, for the purpose of indicating the care given the child intrusted to it.

Code of Iowa See p. 34, (c), and p. 36, (e).

Federal Standards: (e) Supervision of children placed should

include adequate visits by trained and qualified visitors and constant watchfulness over the child's health, education, and moral and spiritual development. Foster parents of children in boarding homes should be trained.

Code of Iowa: The Board of Control is authorized to appoint not more than six persons to act as state agents for the Soldiers' Orphans' Home, the training schools and the women's reformatory. (1913).

The duties of State Agents shall be to find suitable homes when desirable for inmates of said institutions (see 1913) who are to be or have been released, to inspect the homes of such persons, to exercise supervision over such persons, examine into their conduct and environment, and when environment or associations are bad, to require them to obtain other homes. The agents are to keep records of their acts and report to the board of control when required the work they do and results accomplished, the treatment received by the children, and failure or progress made by the persons under supervision. (1914).

Provision is also made for placing children in suitable family homes subject to friendly supervision of the probation officer and further order of the court. (2103).

Supervision is implied in the section which provides that in case any child, whether adopted or placed under articles of agreement for a term of years, is not furnished care, education, treatment, and maintenance required by the articles of agreement, the Board of Control may cause the child to be taken from the person or persons with whom it is placed and may make such other disposition of it as may seem best. (2467).

18. CARE OF ILLEGITIMATE CHILDREN

(1) *Federal Standard:* Save for unusual reasons, both parents should be responsible for the child during its minority, especially the father.

Code of Iowa: The State interprets the word "father" as including the putative father of an illegitimate child, and the question of parentage may be tried in any proceedings to recover for or compel support of such a child, and like proceedings may be prosecuted against the mother independently of or jointly with the alleged father. (3274).

Provision for legal action by any person to establish paternity of an illegitimate child is made in sections 8360-8365.

If the accused is found guilty, he shall be charged with the maintenance of the child in such sum as seems necessary, and in such manner as the court shall direct, and with the costs of the action, and the clerk may immediately issue execution for a sum ordered to be paid, and afterward, from time to time, as it shall be required, to compel compliance with the order of the court. (8366).

It is provided that illegitimate children inherit from the mother, (7915), and from the father when paternity is proven during his life, or they have been recognized by him as his children; but such recognition must have been general and notorious, or else in writing. (7916).

(2) *Federal Standard*: Care by mother during the first nursing months.

Code of Iowa: No provision.

(3) *Federal Standard*: No parents should be allowed to surrender the child outside the family save with the consent of a properly designated state department or court of proper jurisdiction.

Code of Iowa: No provision.

(4) *Federal Standard*: More humane and adequate treatment of such cases in court procedure and otherwise, resulting in greater willingness to have them considered.

Code of Iowa: No provision.

(5) *Federal Standard*: The whole treatment of the unmarried mother and her child should include the best medical supervision and the widest opportunity for education under wholesome, normal conditions in the community.

Code of Iowa: An appropriation is granted to the Board of Control for defraying the expenses of medical attention and treatment for friendless girls in maternity cases that are patients in certain homes for friendless women in Iowa.

(Laws Thirty-ninth G. A., p. 348, Ch. 313, Sec. 10).

See also provisions for county hospitals and free wards, p. 17, *Maternity*, (3).

19. RURAL SOCIAL WORK

Federal Standard: The essential principles of child welfare work should be applied to rural needs, and agencies for rural service encouraged.

Code of Iowa: This very general requirement is not covered specifically in the Code.

20. RECREATION

Federal Standard: Wholesome play, recreation and amusement should be provided by cities and towns, and commercialized recreation should be supervised and safeguarded, for moral education and prevention of delinquency.

Code of Iowa: See pp. 20 to 21 and p. 10 of this study.

21. JUVENILE COURT

(1) *Federal Standard*: Every locality should have a court organization for separate hearings of children's cases, special method

of detention for children, adequate investigation for every case, provision for supervision or probation by trained officers, and a system of recording and filing social as well as legal information.

(2) Procedure should be under chancery jurisdiction and should not stand as criminal record against the child.

(3) Child-placing and relief, or dependency and destitution not involving improper guardianship or final surrender of children should not be required of the juvenile court, but should be administered by existing agencies provided for the purpose.

(4) The jurisdiction of the juvenile court should extend to adult sex offenders against children, and all protection and privacy be given the victims.

(5) In cases of adoption, the court should make a full inquiry into all the facts through its own visitor or some other unbiased agency before awarding custody of the child.

Code of Iowa: (1) *Separate Hearings* are provided in section 2101 which requires that the judge of a juvenile court shall designate a certain time for the hearing of such cases (neglected and delinquent children) and is empowered, when they are tried in summary manner to exclude from the court room at such hearing, any and all persons that in his opinion are not necessary for the hearing of the case. *Probation officers* shall be present at every hearing in the interest of the child.

The judges of the district court, in all counties having a population of 10,000 or over, are required to select one of their number to act as judge of the juvenile court for the ensuing four years. Such judge is to have charge of all matters pertaining to dependent and neglected children, widows' pensions, and any and all matters which are by the law of the state now heard in the juvenile court. (2092).

Children under 17 years of age may not be committed to jails or police stations, but if unable to give bail, may be committed to the care of the sheriff, police officer, probation officer, or other person who shall keep such children in some suitable place provided by the city or county, outside the inclosure of any jail or police station. When any child shall be sentenced to confinement in any institution to which adult convicts are sentenced it shall be unlawful to confine such child in the same yard or inclosure with such adult convicts or to bring such child into any yard or building in which adult convicts may be present. (2100).

Section 3527 appears contradictory in providing that in cities of 25,000 or more, the mayor is to designate one or more station houses within such city for the detention or imprisonment of all women and children under arrest in said city, and see that provisions are made by which the rooms or cells set apart for them shall be separate from and out of sight of the rooms or cells in which male prisoners are imprisoned.

In counties having a population of more than 40,000 it is the duty of the board of supervisors to provide and maintain, separate, apart, and outside the inclosure of any jail or police station a suitable detention home and school for dependent, neglected, and delinquent children. (2110).

Supervision by trained probation officers is required by the Federal Standards and aimed at in the section providing that the court shall have the authority to appoint or designate one or more "discreet persons of good character" to serve as probation officers, though the number is limited to four, in counties having a population of over 35,000, who shall be persons of "good character and special fitness." In case a probation officer shall be appointed by any court it shall be the duty of the clerk of the court, if practicable, to notify said probation officer in advance when any child is to be brought before the court; it shall be the duty of said probation officer to make such investigation as may be required by the court; to be present in order to represent the interests of the child when the case is heard; to furnish to the court such information and assistance as the judge may require, and to take charge of any child before and after trial as may be directed by the court. (2091).

The judge of the juvenile court has the power to select a chief probation officer and not to exceed two deputy probation officers, one of whom shall be a woman. (2094).

Section 6930 states the qualifications of probation officers again as being "good moral character and special fitness."

Provision is made for entering all proceedings, orders, findings and decisions of the said court in a book to be kept for the purpose and known as the juvenile court record. (2090). This obviously does not meet the Federal Bureau's idea that all social as well as legal information should be filed and recorded. Section 2112 provides that the report of the court to the Board of Control shall include the number of juveniles of each sex brought before it, the number for whom homes have been obtained, the number sent to state institutions and the number under charge of such association.

(2) *Federal Standard*: Procedure should be under chancery jurisdiction, and not stand as criminal record against the child.

Code of Iowa: Provision is made for trial of all cases of dependency, delinquency and destitution to the court without a jury. (2099).

(3) *Federal Standard*: Child placing and relief, or dependency, and destitution not involving improper guardianship or final surrender of children should not be required of the juvenile court, but should be administered by existing agencies provided for the purpose.

Code of Iowa: No specific provision, although a large part of this work is done by the Board of Control.

(4) *Federal Standard:* The jurisdiction of the juvenile court should extend to adult sex offenders against children, and all protection and privacy be given the victims.

Code of Iowa: Trial of all persons contributing to the delinquency of children is provided by an act of the Thirty-ninth General Assembly, in juvenile and justice courts as well as in the district and superior courts, and it is also possible to prosecute for any indictable misdemeanor or felony that contributed to the delinquency of the child, as well as for contributory delinquency.¹

The judge of any juvenile court is empowered to exclude from the court room any and all persons that are, in his opinion, not necessary for the hearing of the case. (2101).

(5) *Federal Standard:* In all cases of adoption, the court should make a full inquiry into all facts through its own visitor or through some other unbiased agency before awarding custody of the child.

Code of Iowa: See p. 34, *Principles Governing Child Placing*, (c).

22. MENTAL HYGIENE AND CARE OF MENTALLY DEFECTIVE CHILDREN

(1) *Federal Standard:* Special attention should be given to the training of teachers and social workers in mental hygiene principles.

Code of Iowa: No provision. At the University increasing emphasis is being laid on this work.

(2) *Federal Standard:* Each state should make a thorough study of the school and general population to determine the extent of feeble-mindedness and subnormality, and should make adequate provision for such mentally defective children as require institutional care.

Code of Iowa: It is made the duty of all officers empowered to take the school census to ascertain the number of children of the ages of seven to 16 inclusive in their respective districts, the number of such children who do not attend school, and so far as possible the cause of failure to attend. (2671).

The county superintendent must report to the institution for the feeble-minded all persons of school age who, because of mental defect, are entitled to admission therein. (2503).

The secretary of the school board of directors must within five days after the July meeting in each year, file with the county superintendent the name, age, and post-office address of all feeble-minded children of and between the ages of five and 21. (2601).

¹From mimeographed statement of the Iowa State Conf. of Social Work.

The term "feeble-minded" is to be so construed as to include idiotic children and a custodial department is provided for the care of such as can not be benefited by educational training. (1940).

Section 1941 provides in detail for the admission of every child and youth residing within the state, between the ages of five and 21 years, who by reason of deficient intellect is rendered unable to acquire an education in the public schools, and physical and mental training and care are given at the expense of the State. The county superintendent of the institution the names of all feeble-minded children in his county of such ages, together with the post-office address of the parents, guardian, or nearest friend, and to state whether such children have ever attended school, and how long. (1941).

(3) *Federal Standard*: Special schools or classes with qualified teachers and adequate equipment for those not requiring institutional care.

Code of Iowa: No provision.

(4) *Federal Standard*: Custodial care in institutions for feeble-minded children should not be resorted to until after due consideration of the possibility of adjustment within the community.

Code of Iowa: Petition to adjudicate feeble-mindedness must be acted on only after a report on the case by a commission of two qualified physicians, or one qualified physician and one qualified psychologist. (1957).

The Code provides that if the alleged feeble-minded person is found to be feeble-minded and subject to be dealt with under this chapter, having due regard to all the circumstances appearing on the hearing, the guiding and controlling thought of the court throughout the proceedings to be the welfare of the feeble-minded person and the welfare of the community, it shall enter a decree appointing a suitable person to be guardian of the person of such feeble-minded person, or directing that such feeble-minded person be sent to a private institution, or a public institution. (1959).

In case a guardian is appointed, he is to treat his ward as though he had been the father of said feeble-minded person, and the feeble-minded person had been under the age of 14, (1960); when the case becomes unsuitable for guardianship the person may be set free or sent to an institution, and no order shall be made discharging or varying a prior order placing the feeble-minded person under guardianship without giving one or more of the relatives or a friend of the feeble-minded person, his guardian or the board of control notice and an opportunity to be heard. (1961).

Feeble-minded persons may be discharged from an institution for the following reasons: because the person adjudged feeble-minded is not feeble-minded; because he has so far improved as to be capable of caring for himself; because the relatives or friends of the feeble-minded person are able and willing to care for him and support

him, and request his discharge, and in the opinion of the superintendent of the institution having the person in charge no evil consequences are likely to follow such discharge. (1964).

23. SCIENTIFIC INFORMATION

Federal Standard: There should be more adequate scientific literature dealing with principles and practice in the children's field of social work, and careful interpretation and analysis of methods and results of care. Publishing of these findings must precede the correcting of many present evils in practice. Boards of directors, trustees and managers are particularly responsible for this data.

Code of Iowa: The State Board of Education is authorized to establish and maintain at Iowa City as an integral part of the State University, the Iowa Child Welfare Research Station, having as its objects the investigation of the best scientific methods of conserving and developing the normal child, the dissemination of the information acquired by such investigation and the training of students for work in such fields. (2349). The appropriation and management are provided for in sections 2351 and 2350.

24. CHILD WELFARE LEGISLATION

Federal Standard: Careful reconsideration as a whole at reasonable intervals, of child welfare legislation, in order that necessary revision and co-ordination may be made, and the creation of a child welfare committee or commission if necessary.

Code of Iowa: The Thirty-ninth General Assembly provided for this revision in a general way, in the act creating a commission of three persons to edit and codify the laws of the state, defining its powers and duties and providing for the editing of a book of annotations of the Code by the code editors. It is evident, however, that such a Commission could deal with child welfare legislation only incidentally.

SUMMARY

The Federal Bureau's ideal of state responsibility for children who are for various reasons in need of special care is recognized by the Code in the legislation covering cases of delinquency, destitution, and physical handicaps in all their various forms.

Children who must be removed from their homes are placed in the several institutions where home life is approximated as nearly as may be and are supposed, when possible, to be transferred to suitable family homes by state agents. Family income is supplemented in Iowa by the Workman's Compensation Act, and by Widows' Pensions, although the amounts allowed mothers for care of their children are too small, and the scope of the provisions is

felt by many to be too narrow. Still other provision is made for meagre relief at home by county and city officials and for aiding families of soldiers and sailors in their own homes, although no allowance includes boys over 14 and girls over 16 years of age.

Licensing and supervision of all public and private child caring agencies and institutions is required in Iowa, and the Board of Control of State Institutions is responsible for such supervision and control, but nothing is said of incorporation.

Investigation of foster homes is provided for the children in the Soldiers' Orphans' Home and the training schools and state agents are employed for this purpose. In other cases the approval of the superintendent and the Board of Control is required, and this is no doubt based upon some sort of investigation of the prospective home, though no such statement is made. Theoretically, any person competent to make a will is authorized to adopt a minor.

There is no provision for complete records of each foster home showing information on which approval is based, although state agents are required to follow their charges and inspect the homes and report on conditions found. The state agents, however, act for only three child-caring institutions. Without systematic and thorough investigation only flagrant cases of neglect and maladjustment come to light.

Supervision of adopted children by trained and qualified visitors is not provided for except as the state agents may fulfill this duty. Occasionally a probation officer may be required to supervise a child placed by the juvenile court but this phase of his work is not regularly required. Supervision by the Board of Control is implied in the section providing that they may remove any child from a home where he is not furnished the care, education, treatment, and maintenance required by the articles of agreement. No statement is made as to the machinery of this investigation. On the whole, while the provisions of the Code may in effect comply with the Bureau's suggestions, the laws themselves are not sufficiently definite.

Legal provision is made in Iowa for establishing paternity of an illegitimate child, and the court may compel support of the child in such sums and such manner as it deems best. There is no provision for care by the mother during the first nursing months, no regulation preventing disposal of the child by adoption outside the family, and no regulation tending to secure more humane and ade-

quate treatment of such cases or wholesome, normal educational opportunities.

The Code of Iowa provides, in agreement with Federal Standards, separate hearing of children's cases, a special method of detention and supervision by probation officers although these officers are required only to be "discreet persons of good character and special fitness," and apparently need not have special training. A juvenile court record must be kept and all proceedings, orders, findings, and decisions of the court entered. It must also contain the number of juveniles of each sex brought before it, the number for whom homes have been obtained, the number sent to state institutions, and the number under charge of such association, though this does not meet the intent of the Federal Bureau. Adequate investigation of every case is the duty of the probation officer, and he furnishes the court with necessary information for the trial.

It is probable that most cases of child placing and relief or dependency and destitution not involving improper guardianship or final surrender of a child are taken care of outside the juvenile court but nothing to this effect is found in the Code.

There is no regulation requiring trial of adult sex offenders against children before the juvenile court, though the contributory delinquency act provides for trial of persons contributing to delinquency of children in juvenile and justice courts as well as in the district and superior courts, and would meet the Standard in those cases at least. Protection and privacy are afforded by the exclusion from the court room of persons not necessary to the trial. Probation officers are required to be present at every hearing in the interests of the children. When child placing is done by the court, the probation officer investigates and supervises the child for such time as the court may direct. In general, there is a fair degree of correspondence throughout.

No provision is made in the Code for scientific study of feeble-mindedness, though special departments have recently been created in the University for this purpose. An effort is made to determine the extent of feeble-mindedness by requiring school census-takers to ascertain the number of such children who do not attend school. The secretary of the school board must file with the county superintendent each year the name, age and address of every feeble-minded child between the ages of five and 21, and the

county superintendent reports this number, in turn, to the institution for the feeble-minded. One such institution is provided for by law to admit feeble-minded persons of all ages, and its long waiting list indicates that accommodations are very inadequate.

There is no state law providing special schools or classes with qualified teachers for those not requiring institutional care. Adjustment within the community is aimed at when the court appoints guardians for certain feeble-minded persons, and gives those interested in such feeble-minded persons notice and opportunity to be heard before discharging or varying a prior order.

Provisions requiring reporting of feeble-minded children cannot, however, result in even approximately complete returns without a systematic survey of the state by trained psychologists and psychiatrists.

V. GENERAL SUMMARY

MINIMUM STANDARDS FOR CHILDREN ENTERING EMPLOYMENT

FEDERAL	CODE OF IOWA
	1. AGE
(1) 16 years, any employment; 14 to 16, farm and domestic service during vacations.	14 years. 11 for street occupations and younger in exceptional cases.
(2) 18 years, mines and quarries.	16 during school term. 14 during vacations.
(3) 21 years, night messenger service for girls.	Over 18, no regulations of working hours. Under 18, to 10 P. M.
(4) 21 years, dangerous and hazardous occupations.	Not under 16; 18 for girls cleaning machinery in motion.
	2. EDUCATION
(1) 7 to 16 years, compulsory for 38½ weeks, full or part time.	7 to 16, compulsory for 24 consecutive weeks, unless over 14 and legally and regularly employed or through eighth grade.
(2) 16 to 18, if through eighth grade and employed must attend day continuation school 8 hours weekly.	Blind and deaf, 7 to 19. 14 to 16, holding work permits, or not through eighth grade and employed under certain conditions, or through eighth grade, and not employed, must attend part time schools 8 hours weekly.
(3) 16 to 18, if not through eighth grade or not regularly employed; must attend full time school.	No provision in the Code.
(4) Vacation schools, with emphasis on healthful play, etc.	School farms, optional in cities of 21,000 or over. Playgrounds also optional.

3. PHYSICAL MINIMUM

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|---|-------------------------------|
| (1) Examination by physician to show normal development and ability to perform work contemplated. | Met by provision in the code. |
| (2) Periodical medical examination of all working children under 18. | No provision. |

4. HOURS OF EMPLOYMENT

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|---|--|
| (1) No minor to work over 8 hours per day. | Under 16, not over 8 hours. |
| (2) Hours at continuation school to count as part of working day. | Provided for. |
| (3) Night work for minors prohibited from 6 P. M. to 7 A. M. | Under 18, prohibited 10 P. M. to 5 A. M.
Under 16, 6 P. M. to 7 P. M.
11 to 16, (street occupations).
7 P. M. to 4 A. M., during school.
8:30 P. M. to 4 A. M. in vacations. |

5. MINIMUM WAGE

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|---|---------------|
| (1) Should equal necessary cost of proper living. | No provision. |
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6. PLACEMENT AND EMPLOYMENT SUPERVISION

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|--|---|
| (1) Central agency for all juvenile employment problems. | No provision. |
| (2) Provision for advising children of employment open, assisting them to find suitable work, and supervising first years of employment. | No provision for advising of employment or assisting them to find work. Supervision supplied, in theory, by factory inspection and regulation of conditions for work. |

7. ADMINISTRATION

a. *Employment Certificates*

- | | |
|--|----------------------------|
| (1) Work certificates for all under 18. | All under 16. |
| (2) (a) Proof of age. | Provided for. |
| (b) Proof of completion of eighth grade. | Completion of sixth grade. |
| (c) Physician's certificate. | Provided for. |
| (d) Promise of employment. | Provided for. |
| (3) Certificates issued to employer and returned by him to issuing officer on termination of child's employment. | No provision. |
| (4) Schools, compulsory education department and continuation schools to be kept informed of all certificates issued and refused and unemployed children for whom certificates have been issued. | No Provision. |
| (5) Minors over 18, proof of age for work having age prohibition. | No Provision. |

(6) Record forms standardized and issued under state supervision.

Provided for.

(7) Reports to factory inspection department of all certificates issued and refused.

Provided for.

b. Compulsory School Attendance Laws

(1) Full-time attendance officers in proportion to school population.

Provisions very inadequate.

(2) Enforcement of school attendance laws by above persons under state supervision.

Under county or city supervision.

c. Factory Inspection, and Physical Examination of Employed Minors

(1) Inspection for enforcement of all child labor laws under one department, and the number of inspectors sufficient.

Number of inspectors (three) inadequate.

(2) Staff of physicians to examine periodically all working children under 18.

No provision.

STANDARDS FOR PUBLIC PROTECTION OF THE HEALTH OF CHILDREN AND MOTHERS

8. MATERNITY

(1) Public health nurses.

Employment optional.

(2) Clinics, dental, venereal, etc., for treatment during pregnancy.

Provided for.

(3) Maternity hospitals or wards for all desiring or needing hospital care. Free or part-payment service for needy.

Maternity hospitals licensed and supervised. Provisions for needy partially supplied by clinics at University hospital, county hospitals, and free wards in private hospitals.

(4) Midwives licensed and supervised and required to show adequate training.

Midwives registered and licensed but no statement made as to supervision or training.

9. INFANTS AND PRESCHOOL CHILDREN

(1) Complete birth registration requiring reporting within three days.

Provided for.

(2) Treatment at birth for prevention of blindness, and supervision of positive cases.

Provided for children whose parents are not opposed because of religious beliefs.

(3) (Suitable for local administration).

(4) Public health nurses, one for average population of 2,000.

Employment optional, and number left to discretion of employing agency.

(5) Clinics for treatment of defect and disease.

Partially covered by provision for free treatment of remediable defects at University Hospital.

(6) Children's hospitals or beds in general hospitals or care at home for all sick infants and young children.

Provided for.

(7) State licensing and supervision of all child caring institutions.

Provided for.

(8) General educational work in prevention of diseases and hygiene and feeding of infants and young children, and compulsory course in child hygiene in the public schools.

Special chair of preventive medicine and hygiene provided at State University.

10. SCHOOL CHILDREN

(1) Proper location, construction, hygiene and sanitation of school buildings. No over-crowding.

Provided for.

(2) Adequate playground and recreational facilities, physical training and supervised recreation.

Playgrounds provided for, but are optional. Physical training not required.

(3) Open-air classes and rest periods for pre-tubercular and malnutrition cases.

No provision.

(4) Full time school nurse for not more than 1,000 children.

No provision, though public health nurses partially fulfill the requirement.

(5) Space and equipment for school medical work, and laboratory service.

No provision.

(6) School physician and nurses for:

Partially met by public health nurse provision. No school physician.

(a) Standard yearly physical examinations.

No provision.

(b) Continuous health record.

No provision.

(b) Special examination of all referred children.

Partially fulfilled by examination and recommendation for treatment at University Hospital. Reporting of certain diseases by teachers required.

(d) Supervision to control communicable diseases.

Remediable defects treated at the University Hospital.

(e) Recommendation of treatment for all remediable defects, disease, deformities and malnutrition.

(f) Follow-up work by the nurse.

No provision.

(7) Clinics, (dental, eye, ear, nose, and throat, skin, orthopedic and free vaccination.)

Dental clinics optional. Orthopedic hospital provided.

(8) Nutrition classes.

No provision.

(9) Examination by psychiatrist of all atypical or retarded children.

Required only in case of petition to adjudicate feeble-mindedness.

(10) Education of school children in health essentials.

Provided for.

11. ADOLESCENT CHILDREN

(1) Complete physical examination once yearly, with recommendations for treatment at children's health center.

Provided for.

(2) Clinics for treatment of defect and disease.

No provision.

(3) (Suitable for local administration).

(4) Full-time compulsory education to 16 years, with vocational guidance and training.

(5) (Suitable for local administration).

(6) Legal protection from exploitation, drug habits, vice, etc.

Full-time education to 14 years. Provision for vocational training under Federal Act.

Extensive legislation, though accurate comparison is not possible.

CHILDREN IN NEED OF SPECIAL CARE

12. GENERAL STATEMENT

State responsibility in case of improper home conditions, delinquency or physical handicaps.

Provided for.

13. HOME CARE

State to secure for the child who must be moved from home:

Provided for in connection with state child-caring institutions.

(a) Normal home life.

(b) Health.

(c) Education.

(d) Recreation.

(e) Vocational training.

(f) Moral and spiritual development.

14. ADEQUATE INCOME

Private and government agencies to supplement family income when below average standard of community.

Provided for in part by Workmen's Compensation, indoor relief and Widows' Pensions, though the amounts are generally too small.

15. INCORPORATION, LICENSING AND SUPERVISION

State Board of Charities or some similar body necessary for inspection and licensing of all child caring institutions. Incorporation of such agencies required and subject to approval of the Board.

Provided for by Board of Control of State Institutions, except that incorporation of child-caring institutions and agencies is not required.

16. REMOVAL OF CHILDREN FROM THEIR HOMES

Children not to be removed unless it is impossible to reconstruct family conditions to make home safe for the child, or to supervise the child in his home.

Provided for by comprehensive legislation.

17. PRINCIPLES GOVERNING CHILD PLACING

Investigation of foster homes to require adequate standards of character, intelligence, experience, training, ability, income, environment.

Children under the Board of Control are not placed without its approval but no statement made as to extent of investigation on which approval is based. No provision for other children.

Complete records of foster homes indicating care given the child.

Implied but not expressly required. Machinery of investigation inadequate.

Adequate visits by trained and qualified visitors. Foster parents of children in boarding homes trained.

Partially covered by State Agents and Probation Officers, but not systematically required.

18. CARE OF ILLEGITIMATE CHILDREN

- | | |
|---|---|
| (1) Both parents responsible for the child during its minority. | Legal action may be brought to establish paternity and compel support. |
| (2) Care by mother during first nursing months. | No provision. |
| (3) No parents to surrender child outside the family save with consent of state authorities. | No provision. |
| (4) More humane and adequate treatment in court procedure. | No provision. |
| (5) Whole treatment of unmarried mothers to include best medical supervision and opportunity for education under normal conditions. | Partially covered by appropriation for defraying expense of medical attention in certain homes for friendless women and free wards in county and private hospitals. |

19. RURAL SOCIAL WORK

No special provision.

20. RECREATION

- | | |
|--|---|
| Wholesome recreation to be provided by towns and commercialized recreation supervised and safeguarded. | Establishment of playgrounds, community centres, etc., optional. Supervision of commercialized recreation chiefly consists in prohibiting immoral amusements. |
|--|---|

21. JUVENILE COURT

- | | |
|--|--|
| (1) Separate hearings for children's cases; adequate investigation; supervision or probation by trained officers; recording and filing of social as well as legal information. | Provided for with the exception of requiring special training of probation officers, and record of social information. |
| (2) Procedure under chancery jurisdiction, and not to stand as criminal record. | Provided for. |
| (3) Child placing and relief of dependency and destitution not involving improper guardianship or final surrender of the child should not be required of the juvenile court. | Indirectly provided for by the duties of the Board of Control. |
| (4) Jurisdiction of the juvenile court to extend to adult sex offenders against children. | Covered in cases involving contributory delinquency. |
| (5) All cases of adoption, full inquiry by court's visitor or other unbiased agency. | Requirement partially met by duties of state agents and probation officers, but provision inadequate. |

22. MENTAL HYGIENE AND CARE OF MENTALLY DEFECTIVE CHILDREN

- | | |
|---|---|
| (1) Administrative rather than a legislative problem. | |
| (2) Thorough study to determine extent of feeble-mindedness and subnormality, and adequate institutional provision. | No adequate or scientific study of extent of feeble-mindedness in the state. Institutional provision also insufficient. |
| (3) Special classes for those not requiring institutional care. | No provision. |

(4) Institutional care only when adjustment within community is impossible.

Provision is made for appointing guardians in suitable cases.

23. SCIENTIFIC INFORMATION

Scientific information on children's social work. Boards of directors, trustees, etc., to furnish data for analysis of methods and results of care.

Partially provided for by Iowa Child Welfare Research Station, and by reports from the various institutions to the Board of Control.

24. CHILD WELFARE LEGISLATION

Revision and co-ordination of child welfare legislation at reasonable intervals. Creation of child welfare committees or commissions if necessary.

Partially provided by Iowa Code Revision Committee, although no specific provision made for study of child welfare legislation.

CONCLUSIONS

In certain respects Iowa has made high attainments along the lines urged in the standards of the Federal Children's Bureau. The provisions of the Perkins Law, and the resulting care of sick and crippled children at the Children's Hospital in Iowa City are admirable. Protection of children against moral injury through improper amusements and the offenses of adults is dealt with in extensive legislation. Provisions for the Child Welfare Research Station and other departments concerned with children at the University are splendid beginnings toward the scientific study of child problems.

In many respects, however, the state laws do not come up to the standards recommended by the Children's Bureau. These deficiencies may in part be taken care of without specific state laws having been passed, but on the other hand many of the excellent provisions of the statutes are failing to be realized because of inadequate or improper administrative machinery. Among the chief discrepancies between the Children's Bureau standards and the Iowa laws are the following:

The Iowa provisions as to the minimum ages for leaving school and going to work are about two years lower than the standards, and the required school year is about one-third shorter than that recommended.

No statutory provision is made for systematic medical examination of children in school and at work. School nurses are not provided for by law, and there is no provision in the statutes for open-air rooms.

No adequate legal provisions are made for vocational guidance.

The number of attendance officers and factory inspectors provided for is quite inadequate.

Adequate incomes are not provided for for children in their own homes suffering from undeserved poverty.

Provisions with regard to placing dependent children in foster family homes are not up to the federal standards.

The interests of illegitimate children are not safeguarded in accordance with the standards.

UNIVERSITY OF IOWA STUDIES

STUDIES IN CHILD WELFARE

VOLUME II

NUMBER 4

A TEST OF SOCIAL ATTITUDES AND INTERESTS

BY

HORNELL NORRIS HART



PUBLISHED BY THE UNIVERSITY, IOWA CITY

Issued semi-monthly throughout the year. Entered at the post office at Iowa City, Iowa, as second class matter. Acceptance for mailing at special rates of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918.



UNIVERSITY OF IOWA STUDIES IN CHILD WELFARE

PROFESSOR BIRD T. BALDWIN, Ph.D., Editor

FROM THE IOWA CHILD WELFARE RESEARCH STATION

VOLUME II

NUMBER 4

PROGRESS REPORT ON A TEST OF SOCIAL ATTITUDES AND INTERESTS

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1923

THE TORCH PRESS
CEDAR RAPIDS
IOWA

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FOREWORD

In this preliminary monograph the author has developed an experimental approach to the problem of measuring the social attitudes and interests of adults with a view to adapting the materials and technique to the problem of the social development of children. A practical means for measuring socialization in adults and in children will supplement our psychological and educational measuring scales in their extended application to children. It will also give valuable criteria for rating and evaluating the attitudes and interests of the parent and of the child, the teacher and the pupil, the employer and the employee, the law-abiding citizen and the law-breaking individual, the moral leader and the moral delinquent.

That social psychology is just beginning to enter this field of social development through avenues of experimental methods may be gleaned from the author's annotated bibliography.

BIRD T. BALDWIN

Office of the Director
Iowa Child Welfare Research Station
University of Iowa
Iowa City

A TEST OF SOCIAL ATTITUDES

I. THE OBJECTIVES OF THE INVESTIGATION

The purpose of the experiments reported in this paper has been to develop a reliable instrument for measuring the socialization of various groups of individuals and, if possible, of individuals themselves. The term "socialization" as used throughout this study Mob-mindedness consists in an irrational merging of the individual to feel and act as though the welfare of the individuals and social groups with which he comes into contact were his own welfare.

The concept thus defined must be distinguished from mob-mindedness, from enlightened selfishness, and from unselfishness. Mob-mindedness consists in an irrational merging of the individuality with the group, attended with greatly heightened suggestibility. The socialized person fully retains his individuality and is likely to be especially resistant to irrational suggestion.* Enlightened selfishness is supposed to consist in promoting the welfare of others because cold calculation shows that this is the best way to promote one's own welfare. The socialized individual acts for the welfare of the group, not as a result of selfish calculations but because he has assimilated the interests of the group to such an extent that its welfare is inherently interesting to him. Welfare of the group is for him an end not a means. The process consists essentially in an expansion of the self. It is not, therefore, unselfishness or self-abnegation, though minor personal interests tend to lose force in comparison with larger group interests. The purpose of measuring socialization as thus defined is to become able to study the conditions under which socialization arises and develops to its highest intensity, with a view to learning how this characteristic may be made as widespread as is desirable.

While mental tests have been developed to a high degree and are being widely and increasingly used in the solution of the practical problems of the school, the court, and the factory, very little has

* The definition given by Ross (24 p. 652) is as follows: "By socialization is meant here the development of the *we* feeling in associates and their growth in capacity and will to act together." This definition does not appear to differentiate socialization from mob-mindedness.

been done hitherto in the direction of creating objective tests of social attitudes and interests. Obviously a person may be highly intelligent and still be a useless or even a dangerous citizen, while a person of mediocre intelligence may be a valuable citizen because animated by social enthusiasm and altruism. As psychological science has profited from the development of intelligence tests, so social science has need of practicable socialization tests.

The problem of developing altruism in childhood is the one of immediate interest to the Iowa Child Welfare Research Station. Several hypotheses suggest themselves as to the factors which determine the degree of socialization of the individual. Socialization may be, as intelligence is believed by many to be, almost purely hereditary. It may, again, be almost entirely independent of biological heredity but may depend upon conscious and unconscious absorption of attitudes and interests in the home during pre-school years. Another hypothesis is that attitudes during early childhood are not of great importance, but that the social interests of the individual are determined chiefly by the influences which mould him or her during adolescence. Still another theory is that socialization depends upon religion and that genuine conversion is the best means to develop social vision. The purpose of the present project is to devise a means for testing these and other hypotheses — a research instrument fitted to discover objectively whether an increase in socialization can best be brought about by eugenic methods, by education of parents, by socialization of our school curricula, by social vitalization of the church, by certain types of recreation, or by other means.

Laboratory sciences have progressed by means of the use of delicate instruments for measuring weight, light, heat, electricity, color, time, space, and other variables. A first step in the study of socialization must be the development of a means for measuring the degrees and qualities of socialization in different individuals. Once such a measure has been developed, correlations may readily be worked out between socialization and age, religious attitudes, early training, parental socialization, economic status, type of education, and other significant factors. A socialization test is the first prerequisite.

The present study consists in an analysis of certain experimental data obtained with that version of the test known as Form D. It does not present any method of scoring; it seeks merely to demon-

strate that reactions to Form D are highly differential as between socialized and unsocialized individuals.

II GENERAL METHOD

The method used in the following investigation may be characterized roughly as behavioristic sociology. It consists essentially in presenting to groups of individuals who are known to differ widely in recognized directions in their socialization, stimuli selected with a view to their possible significance in such experiments, and on the basis of the observed differences in the reactions of these contrasted individuals to the stimuli, constructing tests and methods of scoring which will indicate the probable degrees of socialization of individuals whose attitudes it is desired to determine. Two preliminary problems thus are involved: the development of suitable stimuli, and the selection of groups of individuals of known contrasted degrees of socialization.

1. Selection of Stimuli

As to stimuli, it was decided at the start that verbal symbols are the most available and useful for the purpose. Preliminary tests were devised containing words, phrases, and sentences which appeared to be likely to provoke contrasted sorts of reactions in persons having contrasted social attitudes and interests. These preliminary tests were given to various selected groups of students, to members of the Community Club of West Branch, Iowa, to pupils in the upper grades and high school of West Branch, to pupils in the upper grades and high school of St. Patrick's Church in Iowa City, and to a number of individuals. The tests taken by these persons were studied with a view to determining which stimuli gave the most highly correlated reactions. Stimuli to which the reactions of contrasted individuals were practically unanimous or to which the reactions were not correlated with reactions to apparently similar stimuli were discarded.

During this process several preliminary editions of the test were used and several successive radical revisions made. One of the later revisions of the test was given, through the coöperation of the dean of men of the University of Iowa, to a small group made up of men students in the University whose character and conduct were considered by the dean as most helpful in developing high ideals and a fine spirit in the University, and to a few of the men who

had been found to be most difficult and troublesome. On the basis of the contrasts in the reactions of these students, in conjunction with other data, the stimuli which seemed to provoke the most highly differentiated reactions correlated with social behavior differences were selected for inclusion in a brief "thumb nail" edition of the test, which has been printed as "Form D." Other stimuli which in preliminary experiments gave promise of being useful, together with a number of new stimuli which had suggested themselves, were incorporated in three longer forms which were mimeographed as Forms A, B, and C. Charts 1 to 4 on pages 11 to 14 are reproductions of Form D. All of the analyses here given relate to reactions of men to that form.

2. Selection of Men to Take the Test

Selection of a group of persons of unquestionably high socialization was made by the following methods. A list of persons who seemed to the writer competent judges was compiled from his personal acquaintances and from such lists as those of the members of the American Sociological Society, the National Conference of Social Work, and the contributors of ten dollars or more to the support of the *Survey* magazine. This original list contained the names of persons varying widely in their religious, political, and economic points of view, but all of them showed, in the writer's opinion, a high degree of socialization. To each of these judges was sent a copy of the blank, together with a letter explaining the purposes of the investigation and asking the individual to fill out and return the form.

NOMINATIONS

of persons to be included in

A LIST OF AMERICAN LEADERS IN SOCIAL PROGRESS

The undersigned submits the following names of persons believed to be of the types indicated:

1. Employers who are actively and successfully interested in the well-being of their employees.
2. Persons recognized by both capital and labor as being fair to both sides in industrial controversies.
3. Men and women who have done signal service in the interest of cleaner politics, or in the promotion of social justice.
4. Teachers, preachers and publicists who have inspired social vision.
5. Individuals known to be sacrificing personal and financial interests for the sake of their fellows.
6. Eminently successful fathers and mothers.
7. Other types.

CHART 1

A TEST OF SOCIAL ATTITUDE AND INTERESTS

Devised by HORNELL HART, Ph.D.

Associate Research Professor in Sociology

University of Iowa

Iowa City, Iowa

Revised July, 1922

Form D

STUDY THESE INSTRUCTIONS

- | | <i>Sample List X</i> | <i>Sample List Y</i> |
|--|--------------------------------|-------------------------------|
| | Stub your toe.... + \ominus | Seal an envelope.. + — |
| | Tie your shoe.... + — | Succeed splendidly \oplus — |
| | Come to despair.. + \ominus | |
| | Turn a page..... + — | Shut the door.... + — |
| | Fill your pen.... + — | Have a bad fever. + \ominus |
| | Receive \$1,000.... \oplus — | Sleep when tired. \oplus — |
| | Mail a letter..... + — | Turn a faucet.... + — |
| | Be loved..... \oplus — | Be very happy... \oplus — |
| | Be insulted..... + \ominus | Have teeth pulled. + \oplus |
| | Brush your hair.. + — | Pick up a pin.... + — |
| | Have a bath..... \oplus — | See smiling faces. \oplus — |
| | Be seasick..... + \ominus | Buy a newspaper. + — |
| | | Get hurt..... + \ominus |
- a. Read these sample lists carefully, and notice how they are marked:
- b. As you read *Practice List Z* put a circle around the plus sign \oplus after each thing that you are sure you like, and around the minus sign \ominus after each thing that you are sure you dislike. Skip the things you do not care about, one way or the other.
- c. Draw a line under each of the five things that you feel most strongly about in *List Z*.
- d. Draw a double line under the one thing in *List Z* that you feel most strongly about of all.
- e. Put down, in the spaces below, the time when you start on the next list, and the time when you finish the last page:

Practice List Z

- | | |
|-----------------------------------|-----|
| Drink when thirsty | + — |
| Wind a watch.... | + — |
| Go out doors..... | + — |
| Have a bad accident | + — |
| Catch cold..... | + — |
| Fulfill your heart's desire | + — |
| Dry your hands.. | + — |
| Suffer | + — |
| Button your coat. | + — |
| Be spattered with mud | + — |

Start.....M.

Finish.....M.

Actual working time.....minutes.

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CHART 2

Likes and Dislikes. Lists 1 to 4 contain things which people like or dislike to be, to do, or to have happen. Mark, as in Lists X, Y, and Z the things that you specially like \oplus , or dislike \ominus , or that you think you would like or dislike if you had a chance. Draw a line under each of the *five* things that you like \oplus or dislike \ominus most in each list, and draw a double line under the one of the five that you feel most strongly about in each list.

List 1

Be lonely	+ —
Play in an orchestra.....	+ —
See a big boy pick on a little fellow	+ —
Go walking with your father..	+ —
Find out how things work....	+ —
Conquest of weak nations by strong nations	+ —
Help a friend.....	+ —
Drive an automobile.....	+ —
See children left motherless...	+ —
Help make the world happier..	+ —
Try experiments	+ —
Hear symphonies	+ —
Have authority	+ —
Hear an interesting talk.....	+ —
Even-handed justice	+ —
See women go into professions like medicine and the law...	+ —
Discuss religion	+ —

List 2

Belong to a club for study or discussion	+ —
The attitude of European countries toward their colonies..	+ —
Have an operation.....	+ —
Rudeness to one's father or mother	+ —
Do the proper thing.....	+ —
A false friend.....	+ —
Discover truth	+ —
Introduce a person whose name you have forgotten.....	+ —
Have to wear shabby cloths...	+ —
Have a baby hold your finger..	+ —
Fail to hear from your parents, brothers, or sisters.....	+ —
Work for social justice.....	+ —
Do executive work.....	+ —
Be jeered at.....	+ —
Clear thinking	+ —
A poor loser	+ —

List 3

Explore strange country.....	+ —
Succeed in business.....	+ —
Meet people who talk interestingly	+ —
Smoking by women.....	+ —
Do a good piece of work.....	+ —
Make improvements in your home	+ —
Have your children put into an institution	+ —
Vulgar shows	+ —
Have burned food.....	+ —
Be gossipped about.....	+ —
Be friends with people.....	+ —
Loyalty to one's parents.....	+ —
Stir enthusiasm for a good cause	+ —
Feel that God has forgotten you	+ —
Be bored	+ —
Gloomy people	+ —
Attend your family reunion...	+ —

List 4

Unexpectedly touch a dead body	+ —
Move away from friends.....	+ —
Not get credit for what you do	+ —
Find out about the world.....	+ —
Hear a careless player pound a piano	+ —
Be a leader.....	+ —
Play with children.....	+ —
Death of a near relative.....	+ —
Be in informal clothes at a formal affair	+ —
Repression of free speech....	+ —
International jealousy	+ —
Win out in the financial world	+ —
Commune with the Great Spirit	+ —
Protest against social injustice	+ —
Neglect of aged parents by their children	+ —
Do research work.....	+ —
Be cut by an acquaintance....	+ —

Be sure to underline just five items in each list, and to draw two lines under one item in each list.

CHART 3

Things to Read or to Study. Mark lists 5 and 6 like the other lists.

List 5

Baseball news	+	—
Snappy Stories	+	—
Labor and Socialist dailies....	+	—
Scientific American	+	—
About labor problems	+	—
Works of Mark Twain.....	+	—
Smart Set	+	—
Book Reviews	+	—
Ladies' Home Journal.....	+	—
American Magazine	+	—
Philosophy	+	—
About banking	+	—
About eugenics	+	—
About the proper feeding of children	+	—
About science	+	—
About different religions.....	+	—
About what is proper to wear..	+	—
About immortality	+	—
The classics	+	—

List 6

How to train children.....	+	—
Lyric poetry	+	—
The Red Book Magazine.....	+	—
Editorials	+	—
Sporting news	+	—
The Bible.....	+	—
About evolution.....	+	—
About how people think.....	+	—
Short story magazines.....	+	—
Review of Reviews.....	+	—
About Socialism.....	+	—
Humorous books.....	+	—
About revolutions by the work- ers	+	—
Books that have stood the test of time.....	+	—
How to buy and sell stocks and bonds	+	—
About etiquette	+	—
Atlantic Monthly.....	+	—
Judge	+	—

What magazine not listed above do you like specially?.....

Reforms. Mark lists 7 and 8 like the other lists, putting a circle around the plus sign \oplus after things you favor, and around the minus sign \ominus after things you are against. Underline five items, and double underline one in each list, as before.

List 7

Make divorce harder.....	+	—
More harmony with the Divine Purpose	+	—
Soldiers to stop strikes.....	+	—
Hatred between nations.....	+	—
More use of prayer.....	+	—
Collective bargaining.....	+	—
A federation of the world....	+	—
Working class solidarity.....	+	—
Milk and ice funds for babies More honoring of parents by children	+	—
Abolition of capital punishment	+	—
Better pay for school teachers	+	—
Fair treatment for colored peo- ple	+	—
Freer discussion of social and political questions.....	+	—
Repress gambling.....	+	—

List 8

Social justice for negroes....	+	—
More faith in God.....	+	—
Abolition of child labor evils.	+	—
Better housing conditions....	+	—
Christianization of the world..	+	—
Christmas cheer for the poor..	+	—
Concentration of wealth.....	+	—
Soviet control in industry....	+	—
More interest in local politics	+	—
Application of Christian ideals to modern industry.....	+	—
World disarmament.....	+	—
Direct representation in con- gress by industries.....	+	—
Elect good school boards....	+	—
The spirit of universal broth- erhood	+	—
Prohibit smoking tobacco....	+	—
Unionize industry.....	+	—

Remember: Five items underlined, and one item double underlined, in each list.

CHART 4

9. *Truths and Untruths.* Mark this list like the others, putting a circle around the plus sign \oplus after the sentences which you feel are true, and around the minus sign \ominus after the sentences which you feel are untrue. Underline the five most important truths or dangerous falsehoods, and double underline the most important one of all.

A conscious Purpose, greater than the purposes of men, works for righteousness in the universe.....	+ —
Large fortunes have been made only by honesty, brains, and hard work..	+ —
No country ever had as good laws, or as good a government, or a culture as good in any way as we people of the United States have.....	+ —
A teacher or professor who is not contented with the present social system should be discharged.....	+ —
The Japanese are an inferior but dangerous people, who need to be taught that we are masters of the Pacific Ocean.....	+ —
Kindheartedness is what one needs most in order to do good in the world	+ —
It is irreverent, or sacriligious, to put Jesus Christ into the same class with Buddha, Confucius, or Socrates.....	+ —
News published by the average paper is biased in favor of the employers and big business men.....	+ —
"Our Country, right or wrong!" is a noble sentiment.....	+ —
Crime can best be reduced by punishing every criminal severely.....	+ —
By means of prayer one may, in time of need, get help from spiritual powers outside himself.....	+ —
Socialists elected to legislatures, should not be allowed to serve.....	+ —
The United States has at times been tyrannical toward weaker nations..	+ —
Courage and honor are higher values than joy and happiness.....	+ —
All strikes should be prohibited.....	+ —

Answer the following questions:

How old were you on your last birthday?.....

Underline the one of the following which you are:

Boy, girl, single man, single woman, married man, married woman, widower, widow, divorced man, divorced woman.

If you are in school or college, in what grade or class are you?.....

If you have left school, at what age did you leave?..... In what grade or class were you when you left?..... What is your occupation?.....

In what month, day, and year, were you born?.....

What is to-day's date?.....

In what group is this test being taken?.....

What is your name, or number?.....

Turn back and enter on the front page the time you finish.

Returns from this circular letter brought in about 500 different names, many of whom were mentioned repeatedly. To the first 200 persons in this list (omitting a few individuals from whom replies seemed highly improbable and practically all of the names suggested by the investigator alone) a letter was sent, explaining the purpose of the investigation, inclosing a revised nomination form, and also inclosing Form D of the test. The persons addressed were asked to fill out and return the nomination blank, and if they were willing to spare the time, the test blank also. A stamped and addressed envelope was inclosed. As a result of this circular 32 men and 10 women filled out the test. So few women replied that their reactions are not analysed in this study. Later the tests of two other men were added to the group, and one was omitted.

Of course it would be absurd to imply that these are the only "leaders of social progress," or even that they are a fair sample of the individuals properly included under that term. The average degree of socialization of this group, however, is undeniably much above the average degree of socialization of the population as a whole. As a second caution, it must be remembered that none of these individuals is to be held responsible in the least for any feature of this investigation. Two or three stated emphatically their disapproval of the test and intimated that they filled it out only as a matter of personal courtesy to the writer.

The following thirty-three men are included in the list of the "Leaders of Social Progress" who took the test as described above:

David C. Adie, Secretary of the Buffalo, N. Y., Charity Organization Society.

W. W. W. Argow, Pastor of the People's Church, Cedar Rapids, Iowa.

Rev. James E. Barbour, of Pawtucket, R. I.

Kenneth Beal, of Boston, teacher of English in Mechanic Arts High School.

Alfred Bettman, attorney, of Cincinnati, former Special Assistant to the Attorney General of the United States, and author of one section of the Cleveland Foundation's survey of criminal justice in that city.

Rev. W. D. P. Bliss, Editor of the *Encyclopedia of Social Reform*.

Jeffrey R. Brackett, formerly Director of the School for Social Workers in Simmons College, Boston.

Rev. Lewis A. Bradford, College Pastor of the M. E. Church at Iowa State College.

Rev. Dan F. Bradley, of the Pilgrim Congregational Church of Cleveland, Ohio.

Rev. Dwight J. Bradley, of the First Congregational Church of Webster Grove, Mo.

H. P. Carruth, General Manager of the Mead Pulp and Paper Company of Chillicothe, Ohio.

Stuart Chase, Investigator of the meat industry under the Federal Trade Commission; Contributor to the *Survey* and *New Republic*.

Sherman Conrad, Director of the Community Welfare Federation of Wilkes-Barre, Pa.

Charles H. Cooley, Professor of Sociology in the University of Michigan.

George Creel, Chairman of the Committee on Public Information under the Wilson administration.

Edward T. Devine, author and lecturer on social work.

E. D. Dickinson, Professor of Law in the University of Michigan.

James F. Jackson, Secretary of the Associated Charities of Cleveland, Ohio.

William H. Jefferys, Medical Missionary; Superintendent of the Philadelphia Protestant Episcopal City Mission.

Roswell H. Johnson, Professor of Geology at the University of Pittsburgh; co-author of *Applied Eugenics*.

David Starr Jordan, Chancellor Emeritus of Stanford University.

William Kent, Ex-Congressman from California.

Edward M. Lewis, Dean of the Massachusetts Agricultural College.

E. C. Lindeman, Specialist in Social Research, New York City.

William A. McCall, Professor in Columbia University.

Bleecker Marquette, Executive Secretary of the Public Health Federation of Cincinnati, Ohio.

Rev. Irving Maurer, Pastor of the First Congregational Church of Columbus, Ohio.

William B. Munro, Professor of Municipal Government in Harvard University.

Scott Nearing, Lecturer in the Rand School of Social Science.

David Philipson, Rabbi of the B'ne Israel Congregation in Cincinnati, Ohio.

Arthur J. Sweet, Electrical Engineer in Milwaukee, Wisconsin.

J. M. Tilley, Superintendent of Schools in Terre Haute, Ind.

A professor of political economy whose test has been included in this group asks to have his name omitted.

Of these thirty-three men seventeen are listed in *Who's Who in America* for 1921-22. Others are likely to appear in subsequent editions.

For comparison with the reactions of these leaders of social progress to Form D of the test there were available, at the time these analyses were made, copies of Form D filled out by 154 other men.

These men have been classified as follows:

Thieves	10
Employed boys.....	12
Grade and high-school business men.....	36
College business men.....	10
Successful business men.....	9
Junior "medics".....	54
Other college men.....	23
Total.....	<hr/> 154

The "thieves" included a small group of fairly intelligent men accused or convicted of larceny who were tested in the Polk County, Iowa, jail, and a few employed men known to be or suspected of being dishonest or highly undersirable employees.

"Employed boys" include male employees under 18 years of age, chiefly in certain department stores.

"Successful business men" include male employees whose employers designated them as especially valuable. Certain men in the next two groups doubtless might properly be included here.

"College business men" include employed men, chiefly in two department stores, who had attended college, and who are not included in preceeding groups.

"Grade and high-school business men" included other employed males not included in any of the above groups.

"Junior medics" include the members of the junior class in the medical school of the University of Iowa.

"Other college men" include men who have attended college and who are not included in other groups. Most of them were graduate students at the university. Some of them probably might properly be classed as leaders of social progress.

III DIFFERENTIAL REACTIONS

The stimuli in Form D are arranged in nine lists, containing from 15 to 19 stimuli each. To each stimulus seven different reactions are possible, as will be seen by consulting the instructions on the first page of Form D (See Chart 1). The reaction herein-after referred to as "the strongest positive reaction" (\oplus) indicates that the stimulus is asserted by the individual to be pleasant to him, or approved of by him, or true according to his opinion, and that his reaction to that stimulus is the strongest reaction provoked by any stimulus in the list in which the stimulus in question occurs. In Sample List Y, the reaction to "Be very happy" is of

this type. The "strong positive" reaction (\oplus) indicates the same sort of feeling as the preceding type, except that the reaction is designated as one of the five strongest but not the strongest one in the list. In Sample List Y the reaction to the stimulus "Succeed splendidly" is of this type. The "somewhat positive" reaction (\oplus) indicates that the stimulus is asserted by the individual to be pleasant to him, or approved of by him, or true according to his opinion, but that the reaction is not one of the five strongest in the list. In Sample List Y the reaction to the stimulus "See smiling faces" is of this type. The zero reaction ($+ -$) indicates that the individual is indifferent to the stimulus, or cannot decide whether to react positively or negatively. The reaction to "Pick up a pin" in List Y is of the zero type. The somewhat negative (\ominus), strong negative (\ominus), and strongest negative (\ominus) reactions correspond to the positive reactions except that the individual asserts that the stimulus is unpleasant, or is disapproved of, or is considered untrue.

3. The Data

In order to illustrate the above reactions and to indicate the contrast between the reactions of socialized and unsocialized men, Chart 5 shows List 7 marked as the typical "leader of social progress" marked it, and as the typical very unsocialized person marked it.

CHART 5

Reactions to List 7 in Form D

By the typical "leader of social progress"		By the typical very unsocialized man	
Make divorce harder.....	$+ \ominus$	Make divorce harder.....	$\oplus -$
More harmony with Divine Purpose	$+ -$	More harmony with Divine Purpose	$\oplus -$
Soldiers to stop strikes.....	$+ \ominus$	Soldiers to stop strikes.....	$+ -$
Hatred between nations.....	$+ \ominus$	Hatred between nations.....	$+ \ominus$
More use of prayer.....	$+ -$	More use of prayer.....	$\oplus -$
Collective bargaining.....	$\oplus -$	Collective bargaining.....	$+ -$
A federation of the world....	$\oplus -$	A federation of the world....	$+ -$
Working class solidarity.....	$+ -$	Working class solidarity.....	$+ -$
Milk and ice funds for babies	$\oplus -$	Milk and ice funds for babies	$\oplus -$
More honoring of parents children	$\oplus -$	More honoring of parents by children	$\oplus -$
Abolition of capital punishment	$+ -$	Abolition of capital punishment	$+ -$
Better pay for school teachers	$\oplus -$	Better pay for school teachers	$\oplus -$
Fair treatment for colored people	$\oplus -$	Fair treatment for colored people	$\oplus -$
Freer discussion of social and political questions.....	$\oplus -$	Freer discussion of social and political questions.....	$\oplus -$
Repress gambling.....	$\oplus -$	Repress gambling.....	$+ -$

The following tables compare the percentage distributions of the reactions of the "leaders of social progress" and of the other men tested, to stimuli to which their reactions are most clearly differential, classifying the stimuli according to the apparent nature of the characteristic indicated by the reaction.

TABLE 1
*Stimuli to which Positive Reactions are Suggestive of
General Altruism*

Percentage distribution of the reactions of male "leaders of social progress" in comparison with those of other men who have taken the test, to the following stimuli in Form D: Help make the world happier (List 1); Stir enthusiasm for a good cause (List 3); Even-handed justice (1); Work for social justice (2); and Protest against social injustice (4).

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	0	0	0	8	16	48	28	100
Other men tested.....	0	0	4	23	49	19	6	100

The method of deriving Table 1 is shown in Table A. Tables 2 to 17 were similarly derived.

TABLE A
Method of Deriving Table 1

Details of differential reactions of "leaders of social progress" and of other men tested to stimuli to which positive reactions are suggestive of general altruism.

"Leaders of Social Progress"	⊖	⊖	- +	⊕	⊕	⊕	Total
Help make the world happier..	0	0	4	4	12	13	33
Even-handed justice.....	0	0	3	7	17	6	33
Work for social justice.....	0	0	1	4	21	7	33
Stir enthusiasm for a good cause	0	0	2	6	13	12	33
Protest against social injustice.	0	0	3	5	17	8	33
Total	0	0	13	26	80	46	165
Percentage distribution.....	0	0	7.9	15.8	48.5	27.9	100.1
Other men tested	⊖	⊖	- +	⊕	⊕	⊕	Total
Help make the world happier..	0	1	10	77	44	23	154
Even-handed justice.....	1	1	27	86	31	8	154
Work for social justice.....	0	4	52	68	29	1	154
Stir enthusiasm for a good cause	0	2	33	88	20	11	154
Protest against social injustice.	2	20	54	56	21	1	154
Total	3	28	176	375	145	43	770
Percentage distribution.....	4	3.6	22.8	48.7	18.8	5.6	99.9

As shown in Table 1 the stimuli classified as suggestive of general altruism provoke from the leaders group very markedly higher positive reactions than from the other men tested. A man giving the strong or the strongest positive reaction to stimuli in this

group is more than ten times as likely to be the type of individual represented by the leaders group as is a man giving any other reaction. Of the leaders 76 per cent give the strong positive or strongest positive reaction, while of the other men tested only 24 per cent give those reactions. From Table 18 on page 32 of this study it appears that the highest percentage of such reactions in any of the subdivisions of the other men tested is 38 per cent, among the "successful business men," while the next highest is 37 per cent, among the "other college men," and that the lowest percentage is 12, among the thieves.

From Table 2 it appears that men giving the strong or strongest positive reaction to the stimuli therein listed are more than ten times as likely to be of the type in the leaders group as persons giving negative reactions, and from Table 3 it appears that men giving the strong or strongest negative reactions to stimuli therein listed are nearly 70 times as likely to be of the leaders type as men giving the plus reactions. The typical contrasts in reaction distributions hold good, it will be noted, not only for the stronger reactions but also for the weak and zero reactions. Study of

TABLE 2

Stimuli to which Positive Reactions are Suggestive of International and Interracial-Mindedness

Comparison of reactions to the following stimuli: Fair treatment for colored people (7); Social justice for negroes (8); A federation of the world (7); World disarmament (8); The United States has at times been tyrannical toward weaker nations (9)

	⊕	⊕	⊕	+ —	⊕	⊕	⊕	Total
Leaders of social progress	0	1	3	13	36	33	14	100
Other men tested.....	1	4	14	25	35	18	3	100

TABLE 3

Stimuli to which Negative Reactions are Suggestive of International-Mindedness

Comparison of reactions to: Conquests of weak nations by strong nations (1); International jealousy (4); No country ever had as good laws, or as good a government, or a culture as good in any way as we people of the United States have (9); The Japanese are an inferior but dangerous people, who need to be taught that we are masters of the Pacific Ocean (9); "Our Country, right or wrong!" is a noble sentiment (9)

	⊕	⊕	⊕	+ —	⊕	⊕	⊕	Total
Leaders of social progress	7	28	49	15	1	0	0	100
Other men tested.....	2	12	41	18	15	9	3	100

the subdivisions in Table 18 indicates that education and the intelligence correlated with education probably are factors in this contrast, though the medical students, who are highly educated and intelligent, do not make a favorable showing.

Two stimuli related to international-mindedness were omitted from the tables because the observed differences were not clearly greater than could be due to chance. One of these stimuli is "The attitude of European countries toward their colonies" (2). To this stimulus 30 per cent of the leaders showed the strong or strongest positive or negative reactions, while only 6.5 per cent of the other men tested showed such extreme reactions. This difference would occur by chance about once per 300 trials. Probably it indicates a definite tendency on the part of the leaders group to have more pronounced opinions on the subject than other men have. The other omitted stimulus is "Hatred between nations" (7), to which the leaders show somewhat stronger negative reactions than the control group. Two reactions related to criminal justice should be noted here. To the stimulus "Abolition of Capital punishment" (7), only 15 per cent of the leaders give a

TABLE 4

*Stimuli to which Positive Reactions are Suggestive of
Interest in Economic Justice*

Comparison of reactions to: About labor problems (5); Labor and Socialist dailies (5); Collective bargaining (7); Unionize industry (8); about Socialism (6); About revolutions by the workers (6); News published by the average paper is biased in favor of the employers and big business men (9)

	⊖	⊖	⊖	+—	⊕	⊕	⊕	Total
Leaders of social progress	1	3	7	25	35	25	4	100
Other men tested.....	1	4	23	39	24	7	2	100

TABLE 5

*Stimuli to which Negative Reactions are Suggestive of
Interest in Economic Justice*

Comparison of reactions to: Soldiers to stop strikes (7); Concentration of wealth (8); Large fortunes have been made only by honesty, brains and hard work (9); Socialists elected to legislatures should not be allowed to serve (9); All strikes should be prohibited (9)

	⊖	⊖	⊖	+—	⊕	⊕	⊕	Total
Leaders of social progress	5	29	50	13	2	1	0	100
Other men tested.....	2	14	34	19	18	10	3	100

negative reaction, while 42 per cent of the other men tested react negatively. To the stimulus "Crime can best be reduced by punishing every criminal severely" (9), only 3 per cent of the leaders give a positive reaction as compared with 42 per cent of the other men tested. Sixty-one per cent of the leaders showed a somewhat negative reaction as compared with 24 per cent of the other men.

To the stimuli listed in Table 4 men giving the strong or strongest positive reaction are ten times as likely to be of the leaders type as men giving the somewhat negative reaction. Men giving minus reactions to the stimuli in Table 5 are 26 times as likely to be of the leader type as men giving positive reactions. Here again, the contrasts between the zero and the somewhat positive and somewhat negative reactions are significant as well as those between the stronger reactions. For these stimuli none of the subdivisions of the other men tested approximate the reactions of the leaders group, though the college business men and "other college men" come nearest to doing so. The thieves group shows the least interest in economic justice.

Since the above reactions suggested on the part of the leaders, an interest in collective bargaining, socialism, and other more or less radical points of view, it is important to note that their reactions to the stimuli "Working class solidarity" (7), "Soviet control in industry" (8), and "Direct representation in congress by industries" (8) show approximately the same distributions as the reactions of the other men tested.

Certain other stimuli more or less related to the above groups were omitted from the tables because the contrasts in reactions were not great enough to be conclusive. To the stimulus "About eugenics" (5) the leaders gave a higher percentage of somewhat positive reactions than the other men tested; to the stimulus "Abolition of child labor" (8) the leaders showed higher plus reactions than the other men tested; to the stimuli "Better housing conditions" (8), "More interest in local politics" (8), and "Better pay for school teachers" (7) the distributions of the reactions were not materially different for the leader from those of the control group; and to the stimulus "Elect good school boards" (8), the leaders show proportionately more zero and plus-one reactions and fewer plus-two and plus-three reactions than the other men tested show. These tendencies appear to reflect the lower interest

in matters of sentiment and in the interest of small immediate social groups indicated by other reactions of the leaders group.

TABLE 6

*Stimuli to which Positive Reactions are Suggestive of
Intellectuality and Craving for Truth*

Comparison of reactions to: Discover truth (2); Clear thinking (2); Do research work (4); Philosophy (5); The classics (5); Lyric poetry (6); About evolution (6); Books that have stood the test of time (6); Atlantic Monthly (6); Freer discussion of social and political questions (7)

	⊖	⊖	⊖	+—	⊕	⊕	⊕	Total
Leaders of social progress	0	0	1	17	29	38	15	100
Other men tested.....	0	0	5	34	33	22	6	100

Men giving the strong and the strongest positive reactions to the stimuli listed in Table 6 are four times as likely to be of the leaders of social progress type as are men giving the zero and somewhat negative reactions. The "other college men" group is the only one approaching the leaders group in this sort of reaction. The "employed boys" are the farthest toward the other extreme.

TABLE 7

*Stimuli to which Negative Reactions are Suggestive of
Objection to Repression of Freedom of Speech*

Comparison of reactions to: Repression of free speech (4); A teacher or professor who is not contented with the present social system should be discharged (9)

	⊖	⊖	⊖	+—	⊕	⊕	⊕	Total
Leaders of social progress	12	53	27	6	0	2	0	100
Other men tested.....	2	18	43	24	10	3	0	100

To the stimuli relating to repression of freedom of speech men giving the strong or strongest negative reactions are 15 times as likely to be of the leaders type as men giving the zero or plus re-

TABLE 8

*Stimuli to which Positive Reactions are Suggestive of
Intellectual Interest in Religion*

Comparison of reactions to: Discuss religion (1); About different religions (5); About immortality (5)

	⊖	⊖	⊖	+—	⊕	⊕	⊕	Total
Leaders of social progress	0	0	6	33	25	33	3	100
Other men tested.....	1	5	21	36	24	11	2	100

actions. The successful business man group makes the closest approximation to the leaders group reactions to these stimuli, through failing considerably to reach it. The thieves group is farthest removed in its reactions from the leaders.

Closely related to this intellectuality is the interest of the leaders in religious thought. Men giving the strong or strongest positive reactions to the stimuli in Table 8 are 12 times as likely to be of the leaders type as men giving negative reactions. The "other college men" are the only ones who at all approach the leaders' reactions, and the thieves group again is the farthest removed from it.

Certain other stimuli suggestive of intellectuality have been omitted from the above tables because not sufficiently differential to be independently conclusive. To the stimuli "Do executive work" (2), "Be a leader" (4), "Book reviews" (5), "Try experiments" (1), and "Find out about the world" (4) the leaders show somewhat more positive reactions than the other men tested. To the reactions "Hear an interesting talk" (1), "Belong to a club for study or discussion" (2), "Meet people who talk interestingly" (3), "About science" (5), "Editorials" (6) and "About how people think" (6) the reactions of the leaders approximate quite closely to those of the other men tested. To the stimulus "Do a good piece of work" (3) the leaders give proportionately more of the zero and strongest positive reactions than the other men tested, and to the stimulus "Explore strange country" (3) the leaders show more zero and somewhat negative reactions proportionately than the other men tested. The reasons for the variations in reactions shown above are in most cases fairly clear, and the conclusion that the leaders group is markedly more intellectual in its avowed interests than the other men tested seems clearly established.

TABLE 9

*Stimuli to which Zero and Negative Reactions are Suggestive
Indifference to Religious Creeds*

Comparison of reactions to: More faith in God (8); Christianization of the world (8); It is irreverent, or sacrilegious, to put Jesus Christ into the same class with Buddha, Confucius, or Socrates (9); By means of prayer one may, in time of need, get help from spiritual powers outside himself (9)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	0	4	27	29	26	10	4	100
Other men tested.....	0	3	11	21	36	22	7	100

Corroborative of the tendency in Table 9 is marked indifference of the leaders to the stimulus "Feel that God has forgotten you" (3). Men giving the zero reaction to this stimulus are seven times as likely to be of the leaders type as are men giving negative reactions.

In spite of the greater interest shown in the stimuli of Table 8, and in spite of the fact that eight of the leaders group are professionally engaged in religious work, the leaders group is much more likely to give zero or negative reactions to the stimuli related to creeds, listed in Table 9, than the other men tested, and much less likely to give plus reactions. Men giving the somewhat negative reaction to these stimuli are five times as likely to be of the leaders type as men giving the strong or strongest positive reaction. The thieves group is the farthest removed from the leaders in this respect, and none of the groups even approximates the leaders' reactions. Geographical factors may be of some importance here.

Other religious stimuli not included in the above tables are rather significant. To the stimuli "Commune with the Great Spirit" (4), "Application of Christian ideals to modern industry" (8), and "The spirit of universal brotherhood" (8) men giving strong or strongest positive reactions are four times as likely to be of the leaders type as men giving zero or negative reactions. To the stimuli "More harmony with the Divine Purpose" (7), "The Bible" (6), and "A conscious Purpose, greater than the purpose of men, works for righteousness in the universe" (9) men giving the strongest positive, or the zero or negative reactions are about twice as likely to be of the leaders type as men giving the somewhat positive or the strong positive reactions. To the stimulus "More use of prayer" (7) the leaders group shows decidedly more zero and negative reactions and fewer strong and strongest positive reactions than the other men tested. These reactions appear consistent with the hypothesis that the leaders group is markedly more religious in an intellectual and ethical way than the other men tested, but is less addicted to creeds and less swayed by religious emotionality.

In this connection it should be noted that to the stimulus "See women go into professions like medicine and the law" (1), the leaders give no negative reactions, while 32 per cent of the other men tested give negative reactions, and that the leaders give 58 per cent of positive reactions, while the other men tested give only

TABLE 10

Stimuli to which Zero and Negative Reactions are Suggestive of Unconventionality

Reactions to: Do the proper thing (2); About what is proper to wear (5); About etiquette (6); Make divorce harder (7)

	⊖	⊖	⊖	+ —	⊕	⊕	⊕	Total
Leaders of social progress	0	6	29	46	14	5	0	100
Other men tested.....	0	3	7	26	35	25	4	100

34 per cent of positive reactions. Similarly, to the stimulus "Smoking by women" (3), 58 per cent of the leaders give zero or positive reactions, while only 24 per cent of the other men tested give such reactions.

To the stimuli suggestive of conventionality, listed in Table 10, men giving somewhat negative reactions are 24 times as likely to be of the leaders type as men giving strong or strongest positive reactions. None of the other groups approaches the leaders, but by far the most conventional group, as measured by reactions to these stimuli, is the thieves. The stimulus "Be in informal clothes at a formal affair" (4), produced a larger proportion of zero and positive reactions from the leaders than from the other men. To the stimulus "Repress gambling" (7), the leaders give a far smaller proportion of strong and strongest positive reactions than the other men. To the stimulus "Prohibit smoking tobacco" (8), the leaders show a higher proportion of zero and somewhat negative reactions, while the other men show a larger proportion of strong positives strong negatives and strongest negatives. On the other hand, leaders give a larger proportion of strongest negative reactions to "Vulgar show" (3) than do the other men.

To the stimuli suggestive of social disapproval, listed in Table

TABLE 11

Stimuli to which Zero and Positive Reactions Suggest Insensitiveness to Social Disapproval

Reactions to: Have to wear shabby clothes (2); Be jeered at (2); Be gossiped about (3); Not get credit for what you do (4); Be cut by an acquaintance (4)

	⊖	⊖	⊖	+ —	⊕	⊕	⊕	Total
Leaders of social progress	0	4	50	43	3	0	0	100
Other men tested.....	3	22	56	17	2	0	0	100

11, men giving the zero reaction are 15 times as likely to be of the leaders type as men giving the stronger negative reactions. It is a striking fact, in view of the extent to which intelligence is involved in some of the characteristics of the leaders, that "other college men" are farthest from the leaders group in their reactions to this group of stimuli, and that the junior medics show a strong

TABLE 12

Stimuli to which Zero Reactions Suggest Lack of Sentiment

Reactions to: Fail to hear from your parents, brothers, or sisters (2); A false friend (2); Move away from friends (4); Death of a near relative (4); Be lonely (1); See children left motherless (1); Rudeness to one's father or mother (2); Neglect of aged parents by their children (4)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	1	16	54	28	0	1	0	100
Other men tested.....	11	32	48	7	1	1	0	100

TABLE 13

Stimuli to which Zero and Negative Reactions Suggest Lack of Sentiment

Reactions to: More honoring of parents by children (7); Make improvements in your home (3); Milk and ice funds for babies (7); Christmas cheer for the poor (8); Kindheartedness is what one needs most in order to do good in the world (9)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	0	2	8	27	51	12	0	100
Other men tested.....	0	1	2	9	40	38	10	100

similar tendency, in common with the criminals. The successful business men come nearest to the reactions of the leaders.

To the stimuli suggesting personal emotional bonds to individuals and groups directly touched, as listed in Table 12, men giving the zero reaction are ten times as likely to be of the leader type as men giving strong or strongest negative reactions. If this tendency were due merely to a relatively greater interest on the part of the leaders in larger social groups, one would expect merely a shift of the stronger negative to the somewhat negative reactions. As a matter of fact, however, the proportion of zero reactions is four times as great among the leaders, suggesting a real lack of sentimental attachment for immediate individuals. The subdivisions of the other men tested are quite uniform in their contrast to the leaders in this respect. To the stimulus "See a big boy pick

on a little fellow" (1) the reactions are similar to those in Table 12, though less marked. To the stimulus "Have your children put into an institution" (3) the reactions are not differential.

To the positive sentimental stimuli listed in Table 13 men giving the zero or negative reactions are 12 times as likely to be of the leaders type as men giving strong or strongest positive reactions. The thieves show the most extreme contrast with the leaders here. To the stimuli "Be friends with people" (3), "Help a friend" (1), "Loyalty to one's parents" (3), "Attend your family reunion" (3), "Play with children" (4), "About the proper feeding of children" (5), and "How to train children" (6) the reactions show a similar contrast to those in Table 13, though not so marked. To the stimulus "Have a baby hold your finger" (2) the reactions are not differential for the present purpose. The stimulus "Go walking with your father" (1) shows a much smaller proportion of positive reactions from the leaders than from the other men tested, but the stimulus was omitted from the table because it appeared

TABLE 14

Stimuli to which Zero and Negative Reactions Suggest Indifference toward Light Reading

Reactions to: Baseball news (5); Snappy Stories (5); The Red Book Magazine (6); Sporting news (6); Short story magazines (6); Judge (6); Works of Mark Twain (5)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	1	3	22	46	22	5	1	100
Other men tested.....	0	2	11	30	26	26	5	100

likely that the greater age of the leaders might be partly responsible for the contrast.

In connection with Table 14 it may be noted that the "Leaders" show also relative indifference to the "Review of Reviews" (6), to which only 36 per cent give a positive reaction as compared with 58 per cent among other men tested.

To the "Light reading" stimuli listed in Table 14 men giving zero or minus reactions are ten times as likely to be of the leaders type as men giving strong or strongest positive reactions. Employed boys and thieves are farthest removed from the leaders in their reactions, and successful business men approach most nearly to the leaders' reactions. To the stimuli "Smart Set" (5),

"Ladies' Home Journal" (5), and "Humorous books" (6) the leaders show more indifference and dislike than the control group.

TABLE 15

Stimuli to which Zero Reactions are Suggestive of Indifference toward Personal Comfort

Reactions to: Have an operation (2); Have burned food (3); Unexpectedly touch a dead body (4); Hear a careless player pound a piano (4)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	0	4	57	39	0	0	0	100
Other men tested.....	4	18	59	18	1	0	0	100

To the stimuli suggestive of personal discomfort, as listed in Table 15, men giving zero reactions are ten times as likely to be of the leaders type as men giving strong or strongest negative reactions. The thieves show the greatest contrast with the leaders here. To the stimulus "Be bored" (3) the leaders appear more indifferent than the other men.

TABLE 16

Stimuli to which Zero and Negative Reactions Suggest Indifference toward Business Success

Reactions to: Succeed in business (3); Win out in the financial world (4); How to buy and sell stocks and bonds (6); Have authority (1)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	0	1	15	47	21	14	2	100
Other men tested.....	0	0	6	26	31	27	10	100

To the stimuli suggestive of business success, listed in Table 16, men giving zero or negative reactions are four times as likely to be of the leaders type as men giving the strong or strongest positive reactions. Occupational differences are important here; the

TABLE 17

Stimuli to which Zero Reactions Suggest Indifference to Certain Miscellaneous Interests

Reactions to: Find out how things work (1); Drive an automobile (1); Play in an orchestra (1); Scientific American (5)

	⊖	⊖	⊖	+ -	⊕	⊕	⊕	Total
Leaders of social progress	0	0	6	48	32	12	2	100
Other men tested.....	0	0	6	25	40	26	3	100

business groups show, as would be expected, markedly higher interest in business success than the college and medie groups. To the stimulus "About banking" (5) the reactions are consistent with those in Table 16 though not quite so marked.

To the stimuli in Table 17 men giving the zero reaction are four times as likely to be of the leaders type as men giving the strong or strongest positive reactions. The most marked contrasts with the reactions of the leaders here are shown by the most highly educated groups. These statements are also true of the stimulus "Hear symphonies" (1).

A summary of the first 17 tables is given in Table 18. A few stimuli not readily classifiable are not included in the above discussions. To the stimulus "Courage and honor are higher values than joy and happiness" (9) the other men tested show a larger proportion of negative reactions than the leaders. To the stimuli "Introduce a person whose name you have forgotten" (2), "A poor loser" (2), and "Gloomy people" (3) the reactions are not differential for present purposes. The stimulus "American Magazine" (5) was substituted for "Literary Digest" in only part of the tests used in these experiments, and conclusive data have not yet been collected on it.

From the above review it appears that, of the 149 stimuli for which data are available, 93 are so markedly differential in reactions which they provoke as practically to rule out chance in the case of each stimulus considered separately, and at the same time yield results consistent with the general picture of the leader of social progress given herein. Of the remaining stimuli 32 produce results which, while not independently more differential than might result from chance, are consistent with the general picture obtained from the 93 stimuli. The other 24 stimuli do not show significantly differential reactions by the groups herein studied.

4. Safeguards in the Interpretation of the Data

If the data summarized in the above tables (1-18) are taken at their face value, it appears evident that highly socialized men of the type included in the group designated as "leaders of social progress" are relatively intensely interested in international justice, in economic justice, and in social justice in general; that they display an unusual degree of interest in learning the truth about reality, and about religion in particular; that they are, on the other

hand, relatively indifferent to certain fundamental matters of creed; that they are relatively very indifferent to conventionality and to social disapproval; that they show relatively little interest in personal relationships and in sentiment; and that they are relatively indifferent to personal discomfort, to business success, and to certain other interests.

Before the above conclusions can be accepted as valid, however, certain other possibilities must be dealt with, the most important of which are as follows:

a. Are the observed results due to chance, in the sense that if larger numbers of cases had been collected by the same methods used in the present study the results might have been likely to have been significantly different from those arrived at above?

b. Is there any difference in the way the data were collected from the contrasted groups or handled afterwards which may explain the observed differences in the reactions?

c. Do the contrasted groups differ from each other significantly in respects not due to their difference in socialization, and, if so, do these extraneous differences account for the differences in their reactions?

d. Do the reactions represent real attitudes and interests, or are the reactions attempts by the men tested to represent themselves as something which they are not but which they wish they were, or think they ought to be, or to appear to be, or which they think that persons who see the test expect them to be?

Some of the above questions have been touched upon in connection with the individual groups of stimuli having differential reactions. Certain considerations common to all the groups should, however, be presented here.

a. Chance

Are the observed results due to chance? If, from a universe of reactions in which p is the proportion of reactions of a stated sort while q is the proportion of all other sorts of reactions, two samples are drawn at random containing respectively n_1 and n_2 items, then the standard deviation of the difference between the percentages of the stated reaction in the samples is given by the formula*

$$\epsilon_{12} = \sqrt{pq \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}$$

* (31, p. 269).

TABLE 18

SUMMARY

Percentages of Reactions of Stated Types by Men of Various Groups, to the Various Groups of Stimuli described in Preceding Tables

Preceding table no.	1	2	3	4	5	6	7	8
Stimulus group	General altruism	International-mindedness		Interest in economic justice		Craving for truth	Free speech	Interest in religious
Reactions		Positive	Negative	Positive	Negative			
Leaders	76	4	47	7	29	19	8	6
Others	24	19	21	23	9	39	38	27
College men	37	9	27	22	11	20	9	14
Junior medics	17	24	18	26	4	36	29	31
Successful business	38	20	33	31	11	31	32	24
College business	20	10	22	17	14	40	35	31
High and grade business	29	17	18	21	37	50	20	35
Employed boys	23	17	29	18	11	56	63	6
Criminals	12	28	18	24	4	46	17	34
							70	10
								50
								8
								0

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Preceding tab. no.		9	10	11	12	13	14	15	16	17
Stimulus group	Indifference to creeds	Unconven- ality		Social dis- approval	Lack of sentiment		Light reading	Personal comfort	Business success	Various interests
		⊕ ⊕ ⊕	⊖		Negative	Positive				
Reactions	⊕ ⊕ ⊕	⊕	⊕ ⊕ ⊕	⊕ ⊕ ⊕	⊕	⊕ ⊕ ⊕	⊕ ⊕	⊖	⊕ ⊕ ⊕	⊕ ⊕
Leaders	14	26	5	4	17	12	6	39	17	16
Others	29	11	29	24	43	48	31	22	37	34
College men	29	18	21	24	40	31	28	15	23	28
Junior medics	26	9	27	30	48	47	30	23	29	35
Successful business	17	11	22	4	43	56	27	17	14	28
College business	27	15	30	24	42	26	34	25	33	40
High & grade bus.	28	9	37	21	40	56	30	22	49	27
Employed boys	28	9	21	22	33	56	43	29	50	37
Criminals	32	8	47	28	44	72	39	25	42	36

If the distributions of the differences are normal, the difference between two such samples which will be exceeded by chance on the average once per 100 trials is 2.58 times ϵ_{12} as given above.

The use of this formula may be illustrated in connection with reactions to the stimulus "Work for social justice." Among the 33 leaders of social progress, 28, or 84.9 per cent, gave the "strong" or "strongest" positive reaction. From among 154 other men tested, 30 — or 19.5 per cent — gave these reactions. Since the "other men tested" more nearly approximate a normal population than the leaders, or a combination of the two groups, the value of p is taken as .85; q will of course then be .15, and pq .1275. The value of $\frac{1}{33} + \frac{1}{154}$ is .0368. Substituting in the equation,

$$2.58 \epsilon_{12} = .178$$

In other words, if the 33 leaders of social progress were a random sample from a universe like the 154 other men tested, the difference between the percentage of strong or strongest positive reactions in the two groups which would be exceeded by chance on the average once per 100 trials is about .18. The observed difference is 84.9 minus 19.5, or .654. This is more than 3.6 times as large as the once per 100 trials error. The observed difference would occur by chance only once in billions of trials.

This is an extreme case, but no stimulus has been included in the above tables where the observed difference, considered entirely by itself, would be likely to be exceeded by chance oftener than once in each 100 trials. The stimuli with regard to which data are presented above constitute 92 of the 150 stimuli in the test. Several once-per-100-trials distributions might be expected by chance from the test, but of course not 92 such distributions, especially since most of the observed differences would occur by chance only once in hundreds, thousands, millions, or billions of trials. Moreover the consistency of the results rules out the chance hypothesis. It has been seen in the detailed discussion that practically none of the 58 stimuli not included above give differential reactions inconsistent with the tentative conclusions outlined above. Chance may therefore be dismissed. Even with only 33 and 154 cases involved, the observed results would not be fundamentally different even if an indefinite number of additional cases were collected under the conditions obtaining in the experiments described.

b. Differences in the Treatment of the Different Groups

Certain differences did exist in the way the tests were taken by the contrasted groups. The "leaders of social progress" were requested, in a letter describing the method of nomination, to fill out by themselves a test to be used as representing the reactions of a leader of social progress. The great majority of the 154 other tests were given in groups, with no other explanation of the test than that contained in the title "A Test of Social Attitudes and Interests." The members of the business groups had a very definite temptation to represent themselves as better than they really were, since the test was given by their employers or under the employers' auspices. No space was left on the leaders' tests for them to sign their names, though an identifying symbol was placed on each before the tests went out. In general it is my belief that the differences in the manner of giving the test, except perhaps in the case of the business men, had very little influence. The average time consumed in taking the test was between twenty-five and thirty minutes for both the leaders and the "other college men" groups.

c. Differences other than Socialization between the Groups

A more serious issue is whether there existed differences between the groups other than those due to their difference in socialization. Several such differences appear. The leaders are from points scattered over the United States, but chiefly in the North and East; the other men tested come chiefly from Iowa and Milwaukee. No single men appear among the leaders, while a number are included among the other men. The great majority of the leaders are college graduates; most of them have taken graduate study. The other men range in education from graduates to persons who left school in the grades, and hence the average education of the other men is considerably lower than that of the leaders. As to occupation, eight of the leaders are or have been in religious work; seven are social workers, seven are college or university professors or officers, and the others are scattered through various professions. The occupations of the other groups are indicated in their classification. The "other college" group is made up almost wholly of professors, teachers, school superintendents and students.

The age distribution of the leaders is markedly higher than that

of the other men tested. Half of the leaders are more than forty-five years of age, while very few of the other men are as old as that.

In order to get some idea of the importance of the educational and occupational differences between the leaders and the other men the reactions have been summarized for the subdivisions of latter group in Table 18, on page 32. Of the 33 groups of reactions analysed in that table (counting each column as a group), 18 show a greater contrast between the leaders and the whole group of other men tested than between any two sub-groups among the other men tested. Before final conclusions can be reached it will be necessary to collect enough cases so that irrelevant differences between the leaders and the other men may be eliminated. As the case now stands, however, it is my opinion that the contrasts shown really reflect, with minor exceptions, essential differences in degrees of socialization.

Objection may be raised on the ground that the method of selecting the "leaders of social progress" is not, in the objector's opinion, one calculated to result in a representative group of persons more highly socialized than the general population. It may be urged that the prejudices and preferences of the investigator entered into the selection of judges to such an extent that the attitudes shown are essentially different from what would have been the findings if some other person had made the investigation. The weight of this objection must be determined by the reader for himself in the light of the methods of selection used and of the list of men in the leaders group.

d. Insincerity and Rationalization

The objection most frequently raised in connection with the test is that the reactions shown are not at all certain to represent the real attitudes of the persons tested, because the persons taking the test are likely to give the reactions which they feel are praiseworthy rather than reactions corresponding with what they would be likely to do in a real situation. This objection is important in connection with any theorizing as to the reasons for the observed contrasts between the reactions of the various groups, but it is not a valid objection to the test as a measure of socialization. It is clear from the data presented above that highly socialized men react differently to the test from relatively unsocialized persons.

Whether these differences in reaction are due to real differences in likings and beliefs or to differences in conceptions as to what is praiseworthy, the fact remains that the differences in reactions are symptomatic of differences in socialization.

As a matter of opinion, however, this objection to taking the reactions at their face value is likely to be over-weighted. The test was devised with a view to minimizing rationalization, and most persons taking the test for the first time, without previous study of it, under the pressure of a time control, and with the stimuli mixed together as they are, are likely to give fairly sincere pictures of themselves. This is especially true in view of the fact that the stimuli which produced fairly unanimous reactions have been eliminated, and that many of the significant reactions are of the zero or somewhat positive or negative type, which are not likely to suggest themselves to the person tested as being of importance.

At first the question arose as to whether the apparent indifference of the leaders to certain interests might not be due to their having used up their quota of the three and two reactions on matters in which other men were not interested, so that, though they were as much interested in the remaining items as other men, they had only the plus or minus one reaction left to use. That this is not the case, however, seems evident from the fact that the leaders had only 149 per cent as many plus or minus one reactions as they had zero reactions, while the other men tested had 189 per cent as many plus or minus ones as zeros. Moreover, in the detailed discussion it appears that the tendencies shown in the distribution of strong and strongest reactions is usually apparent also in the distribution of zero and "somewhat" reactions.

IV CONCLUSIONS

This investigation has demonstrated that the verbal stimuli contained in Form D of the Test of Social Attitudes and Interests provoke markedly differential reactions from a selected group of highly socialized men in comparison with a larger group of other men tested. The differences in reactions are such as to indicate that the men in the highly socialized group either are, or believe themselves to be, or think it desirable to appear, markedly more interested in international, economic, criminal, and social justice, far more interested in discovering truth and having it spread

abroad freely, more interested in intellectual and ethical aspects of religion but less interested in creeds and forms, far less interested in conventionality and social approval, decidedly less sentimental and dominated by sympathy and immediate personal bonds, and much more indifferent to light reading, to certain aspects of personal comfort, to business success, and in general to trivial and selfish interests than the other men tested are, or believe themselves to be, or think it desirable to appear. The subdivision of the control groups which most often most extremely differs from the leaders group is the small group of thieves. While some of the characteristics of the leaders, such especially as intellectuality, are most closely approximated by the highly educated groups, certain others are most alien to those groups.

The data discussed demonstrate that the type of test in hand has definite possibilities for diagnostic and research purposes for the ends outlined in the introduction to this study.

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